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IMPORTANT INFORMATION

ON THE

Value of By-Product Factories

Suggestions for the Control of Plant Diseases

Spray Calendars

Apples Sold in 484 Cities and Towns—
Constructive Work in Opening
Up New Markets

BETTER FRUIT PUBLISHING COMPANY, PUBLISHERS, HOOD RIVER, OREGON

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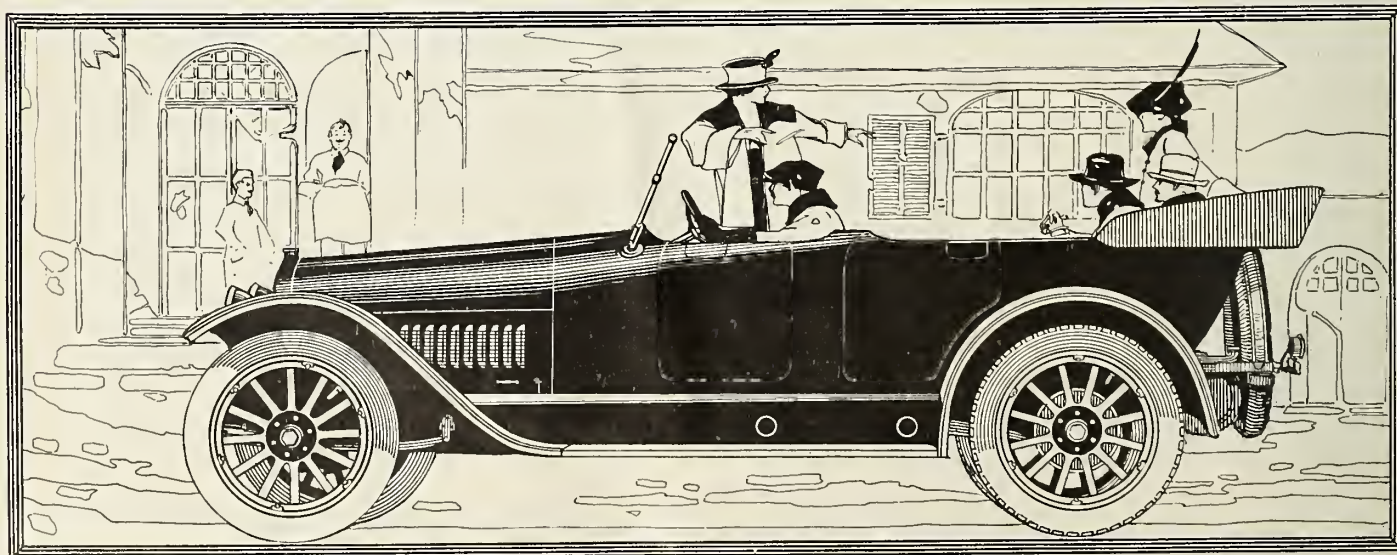
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BETTER FRUIT

AN ILLUSTRATED MAGAZINE PUBLISHED MONTHLY IN THE INTEREST OF MODERN, PROGRESSIVE FRUIT GROWING AND MARKETING

Spray Formulas for 1917

By A. L. Melander, Entomologist, Washington Agricultural Experiment Station, Pullman, Washington

THERE is no single spraying that will kill everything. Select the ones that fit your case. Many plant diseases and pests cannot be controlled by spraying and require special treatments. For information about insects, pests, plant diseases and spraying write to the Experiment Station, Pullman, Washington. The advice is free.

1. LIME-SULPHUR

Ground sulphur 110 pounds
Fresh calcium stone lime.. 50 pounds
Water to make..... 50 gallons

Slake the lime with 10 gallons hot water. Stir in the sulphur and add the remainder of the water. Boil briskly until the sulphur is dissolved (about 45 minutes) stirring continuously and keeping the cooker covered. As the liquid boils down add water to keep to the original level. When finished let any remaining sediment settle. Use only the clear liquid, which may be stored if kept from the air. Prepared in this way lime-sulphur should have a hydrometer reading of about 26 degrees, Beaume, somewhat weaker than the factory-made product.

For use any concentrated lime-sulphur may be diluted according to the following table:

		To make 100 gals. spray use:	
		For dormant	For summer
Hydrometer test of concentrate		spray	spray
Degrees	Specific Gravity	(1 lb. sulphur in 5 gal. sp. gr. 1.02)	(1 lb. sulphur in 10 gal. sp. gr. 1.01)
Beaume		3° Beaume;	1.5° Beaume;
34	1.3015	6.7 gal.	3.3 gal.
32	1.2788	7.2 "	3.6 "
30	1.2569	7.8 "	3.9 "
28	1.2357	8.5 "	4.2 "
26	1.2153	9.4 "	4.7 "
24	1.1955	10.2 "	5.1 "
20	1.1578	12.3 "	6.2 "

Use as dormant spray when buds are swelling, for San Jose scale, oyster-shell scale, insect and mite eggs, bud-worm and twig borer. Concentrated lime-sulphur mixed with lime whitewash is useful to coat tree trunks for rabbits and borers. In summer strength for orchard mites. Also a valuable fungicide for mildews, apple anthracnose, apple scab, peach leaf-curl and lichens.

2. SODA-SULPHUR

The dry powdered forms of soda-sulphur on the market, such as Sprasulphur or Soluble Sulphur Compound, may be dissolved in water at the rate of about 50 pounds to 100 gallons, when they give a spray comparing in polysulphid (the killing value) content with dormant strength lime-sulphur. A similar spray may be prepared in liquid form as follows:

Ground sulphur 1½ pound
Potash or lye (Babbitt's) ... 1 pound
Hot water ¾ gallon

Add the ingredients to the hot water, whereupon the chemical reaction takes

place almost immediately. Stir a few minutes until dissolved. The concentrate may be diluted according to hydrometer test, but nearly twice as much should be used as in the case of lime-sulphur. For example, if the concentrate tests 24 degrees use 20 gallons (instead of 10.2) to make 100 gallons of dormant spray.

Use as dormant spray for same pests as lime-sulphur. Unsafe during growing season.

3. FISH-OIL SOAP

Water 20 gallons
Lye or potash, 98%..... 7 pounds
Fish oil 5 gallons

Boil the water, dissolve the lye in it and stir in the oil. Boil for two hours. This should make about 130 pounds of gelatinous soap.

Use (a) as an emulsifier for oil sprays, (b) to increase the effectiveness of nicotine spray, (c) dissolved 1 pound to about 5 gallons of water as a contact spray for soft-bodied insects like aphids, young scales, thrips, on tender plants. The addition of quassia is unnecessary. Laundry soap may be substituted for fish-oil soap.

4. CRUDE-OIL EMULSION

Boiling water 8 gallons
Lye or potash..... 3 pounds
Fish-oil soap (Formula 3)..... 20 pounds

Dissolve in order named to form the emulsifier; then, with vigorous agitation, slowly add 20 gallons of crude (not fuel) oil. The resulting miscible oil may be poured in the spray tank and with the agitator running fill with water to 200 gallons.

It is much more dependable to use the ready-made miscible oils on the market, which should be diluted according to the directions furnished on the container. Orchard Brand Oil, Scalecide National Soluble Oil and Dormant Soluble Oil have given us good results against San Jose scale.

Use as a dormant spray recommended where lime-sulphur has proved unsatisfactory. Not an efficient fungicide.

5. KEROSENE EMULSION

Kerosene 2 gallons
Fish-oil soap (Formula 3) .. ½ pound
Boiling water 1 gallon

Cut the soap in slices if hard, boil until dissolved and churn the hot suds into the kerosene, away from the fire. When emulsified stir into 35 gallons of water, for summer use. This spray has largely been replaced by nicotine.

Use: A contact spray for sucking insects, like woolly aphid, green aphid, plum aphid, etc.

6. NICOTINE, OR TOBACCO SPRAYS

40% nicotine (Blackleaf 40) . 1 pint
Fish-oil soap (Form. 3) . 3 or 4 pounds
Water 125 gallons

Dissolve the soap in hot water, add the nicotine and dilute.

A similar decoction can be made by soaking 50 pounds of dried tobacco plants in 100 gallons of water for 24 hours, stirring frequently. Strain and dilute the solution obtained with an equal amount of water and add the required soap. Such home-made spray is variable in nicotine content and will not keep.

Use: The standard summer spray for aphids or plant lice, leaf hoppers, orchard mites, thrips and young worms.

7. PYRETHRUM: HELLEBORE

Pyrethrum powder or white
hellebore powder 1 pound
Warm water 2 gallons

Make a paste of either powder by stirring in a little boiling water, add the remaining water and let stand for 24 hours. Then dilute to about 15 gallons. The efficiency of this spray is increased by adding a solution of 1 pound of soap. Either powder may be dusted dry.

Use: For soft-bodied insects like currant worms, or slugs, especially on small fruits ready for picking.

8. ARSENATE OF LEAD

Arsenate of lead, paste..... 1 pound
Water..... 40 to 50 gallons

For newly-hatched insects it is not necessary to use it stronger. For old or large insects use double the quantity, or more. Smooth the paste thoroughly with a small amount of water before putting in the spray tank. Arsenate of lead powder is twice as strong as the paste. Do not use arsenate that feels gritty or that settles rapidly.

Arsenite of zinc powder or paris green are about four times as strong as paste lead. They are especially valuable for resistant insects like tent caterpillars, tussock worms and beetles, but may scorch in a damp season. If paris green is used as a liquid spray add 5 pounds of fresh slaked lime to each pound of poison.

Use: The standard poison for coating foliage or fruit as a protection against chewing insects, caterpillars, codling-worm, cherry slug, etc. Valueless for sap-sucking insects like aphids, scales, orchard mites, or leaf hoppers.

9. POISONED BAITS

Bran, shorts or flour 30 pounds
Paris green, zinc arsenite or
white arsenic 1 pound

Mix dry, season with either (a) 4 lemons, ground through a meat chopper; or (b) 1 or 2 quarts molasses; or (c) 1 pound salt. Then add enough water to form a mash and scatter where required. Fresh horse manure, free of straw, may be used

instead of the bran, seasoning then with salt. Arsenite of soda (see Formula 15), the quickest-acting insect poison known, may be used as the poison in either formula at the rate of 3 pints of the stock solution to the 30 pounds of bran, etc.

Use: For cutworms, grasshoppers or crickets. Do not apply directly to young trees but distribute on the ground, either by spoonfuls or broadcast.

10. BORDEAUX

	Double	Standard	Weak
Bluestone (cop. sulphate).....	10	5	2 lbs.
Stone lime	8	5	2 lbs.
Water to make.....	50	50	50 gals.

Dissolve the bluestone by suspending it in a sack in 25 gallons of water in a barrel, or by crushing it and adding to hot water. Slake the lime in another vessel, adding a little water slowly, and dilute to 25 gallons. Mix the two thoroughly, which is usually done by pouring the two simultaneously into a third vessel.

Use: (a) The standard formula is a repellent for leaf-eating insects because of the metallic taste. Valuable for cutworms, grasshoppers, flea beetles. (b) As a fungicide. Double strength used in Western Washington as a late fall or winter spray for anthracnose; the weak formula a summer spray on delicate foliage for cherry shot-hole or peach blight; the standard strength for scab.

11. SULPHUR

Sublimed flowers of sulphur or ground sulphur flour is sometimes used as a dust spray, either alone or diluted with equal parts of hydrated lime. As a liquid spray, for every 20 gallons stir 1 pound of sulphur into a flour paste made of 1 pound of flour and 1 gallon boiling water, before diluting.

Sulphur paste, milled sulphur, atomic sulphur and diatomic sulphur are commercial preparations containing about 50 per cent of finely-divided sulphur. They are used at 2 to 6 pounds to 50 gallons.

Use: For orchard mites and mildew. A stronger spray than iron sulphide, liable to burn very young fruit in hot weather.

12. IRON SULPHIDE MIXTURE

Lime-sulphur, 32°.....	5 gallons
Ferrous sulphate (green vitriol or copperas).....	20 pounds
Water to make.....	200 gallons

Add the lime-sulphur to the spray tank nearly full of water and with agitator running stir in the iron sulphate, previously dissolved in about 10 gallons of water. The mixture consists principally of black iron sulphide and finely-divided sulphur. It is the latter that gives value to the spray.

An equivalent spray can be produced by stirring together the following and then adding to a 200-gallon tank of water:

Water	25 gallons
Sulphuric acid, commerce.....	1.2½ quarts
Lime-sulphur, 32°.....	5 gallons

13. SOIL FUMIGANTS

A. Carbon Disulphide. Allow two-thirds ounce to each square yard of surface and cover immediately with

oilcloth. Extremely volatile and inflammable.

Use: For borers, cutworms, root weevils, wireworms; in strawberry fields, gardens, etc.

B. Cyanide. Pour 1 per cent solution of sodium cyanide (deadly poison) into spots requiring treatment. Do not inhale fumes. Destructive to plants as well as insects, but soil treated becomes safe in a few days.

Use: For exterminating ant nests, for woolly aphid and other subterranean insects.

	Lime-sulphur	Soda-sulphur	Soap	Crude oil emulsion	Kerosene emulsion	Tobacco	Arsenate of lead	Bordeaux	Atomic sulphur	Iron sulphid
Soda-sulphur	Ux									
Soap	O	X								
Crude oil emulsion.....	O	X	Xu							
Kerosene emulsion.....	O	X	Xu	X						
Tobacco	X	O	X	X	X					
Arsenate of lead	Xrs	O	Os	Xrs	Xrs	Xr				
Bordeaux	O	O	O	O	O	X	Xr			
Atomic sulphur.....	Ux	Ux	X	Ux	X	X	X	Ux		
Iron sulphid.....	Ux	Ux	X	Ux	X	X	X	Ux	Ux	
Lime	Ux	O	O	O	O	X	Xr	Ux	Ux	Ux

14. FUMIGATION FOR NURSERY STOCK

Sodium cyanide, 130%.....	1 ounce
Water	24 ounces
Sulphuric acid	1½ ounces

This amount is sufficient to fumigate 150 cubic feet. Place the nursery stock in a box made gas tight by sealing with building paper if necessary. Pour the acid into the water in an earthenware bowl and set it on the plants. Wrap the cyanide in a paper and drop into the bowl of acid, immediately putting down the cover. Fumigate for 30 to 45 minutes. Do not inhale any of the gas, for it is fatally poisonous. Do not fumigate evergreens. Do not fumigate stock after the buds open. For grafts or scions use two-thirds the formula. For greenhouses use one-third the formula.

15. WEED KILLERS

A. Iron Sulphate.

Iron sulphate (green vitriol or copperas).....	20 to 80 pounds
Water	50 gallons

B. Arsenite of Soda (poison).

White arsenic (arsenious acid) ..	1 pound
Potash or lye	2 pounds

Boil the ingredients of B together in 2 gallons of water. For use dilute this stock solution to 50 gallons.

Use: Either A or B sprayed over young weeds will kill them. Used for mustards and other broad-leaved plants. Old weeds become very resistant.

16. COMBINATION SPRAYS

Some sprays are not injured if mixed together. Other sprays have their properties changed when combined and should not be mixed. A combination spray for apple scab, codling moth and aphids could consist of

40% nicotine	1 pint
Lime-sulphur, 32°.....	5 gallons
Arsenate of lead, paste	5 pounds
Water	125 gallons

To this spray soap should not be added.

The following table shows what sprays can be mixed together and what

ones are incompatible. "X" indicates that there is but slight or no chemical reaction and the sprays can be safely mixed; "O" indicates that there is a reaction which harms or destroys the value of the individual sprays; "R" indicates that the mixture is more or less repellent to the taste of chewing insects and hence the combination is not apt to be so effective as if the arsenical were used alone; "S" indicates that the combination might scorch foliage; "U" indicates that the mixing is unnecessary:

PROGRAM FOR THE MORE USUAL ORCHARD SPRAYINGS

* W., Western Washington; C., Central Washington; E., Eastern Washington.

- When buds begin to swell:
Oil spray or 3 degree lime-sulphur (W, C, E*).
- A general cleanup for scales, insect eggs and fungi, particularly important for San Jose scale.
- With nicotine added, the most valuable treatment for aphids when buds first show green (W, C, E).
- When new foliage is first appearing:
Nicotine (W, C, E) usually unnecessary if given in preceding. For aphids, orchard mites, thrips, leafhoppers. With arsenical added (W). For budworm (W), twig borer (C).
- When blossoms are ready to open (apple, pear):
Lime-sulphur, 1.5 degrees. For scab (W, E) and mildew (W, C, E).
With nicotine added, for orchard mites, aphids, thrips.
- When last petals are falling (apple):
Arsenate of lead. For codling moth, caterpillars (C, E).
With lime-sulphur, 1.5 degrees, added. For scab (W, E) and mildew (W, C, E).
- Additional summer sprayings may be needed, as arsenate of lead for codling moth and caterpillars; nicotine for aphids, oyster-shell scale, mites; bordeaux for grasshoppers.
- In November:
Lime-sulphur, 3 degrees, or bordeaux, double or standard strength. For apple anthracnose (W).
Nicotine (W, C, E). For returning aphids.

HINTS ON SPRAYING

It takes a definite quantity of material to spray a tree thoroughly, whether applied at high or low pressure or whether applied as a mist or a driving spray. Low pressure does not save material, but wastes time. The labor

cost in spraying often exceeds the cost of the materials used.

High pressure is mainly valuable in lessening the time it takes to spray, but high pressure increases the range of a nozzle and adds to the penetrative force of the spray, thus bettering the chance of doing effective work.

The bodies of insects are greasy and hard to wet, yet many sprays depend on coming in actual contact with the insect in order to kill. Many insects and many eggs are located in the lowermost crevices of rough bark, out of reach of any but a penetration system of spraying.

Therefore, spray thoroughly. Direct attention to the hardest places to reach. Cover every surface. Wet behind the buds and into the bottom of every crack. Fill the lower calyx cup. Do not try to economize on spray by doing superficial work or by missing the ends of the branches. For all orchard spraying, use a high-pressure pump, 250 pounds if possible. Use only nozzles of the Clipper or Bordeaux type, as they alone combine speed, range and penetration. Use an 8-foot spray rod. Have a crook-joint to set the nozzles at an angle of forty-five degrees. Spray from a tower if the trees are beyond

reach from the ground. For dormant and calyx spraying throw most of the liquid downward, stroking the branches from the tips toward the trunk, but some spraying must be done in every other direction as well. Do not try to improve on the formulas by adding other ingredients or by using the spray stronger than recommended. There's a reason.

Watch your spray pump. Have it overhauled and in readiness before it is time to spray. Wash out the spray liquid at the end of each day's work. In freezing weather drain off the liquids when through.

Cost of Operation and Returns from Evaporated Fruits

By Dr. J. S. Caldwell, Plant Physiologist of Washington Agricultural Experiment Station, Pullman, Washington

[Editor's Note.—This article was prepared by Dr. J. S. Caldwell, Pullman, Washington, after extremely careful research work covering a period of many months. It is the Editor's opinion that the information is the most practical and valuable upon the subject that has ever been published and should be of great value to every fruit district, for the reason that every fruit district should be interested in evaporation. Conserving the waste has already impressed itself upon the fruit growers as a vital necessity, and therefore prompt consideration should be given. The information contained in this article was delivered in the form of an address before the Fruit Growers' Conference at the Ninth National Apple Show, Spokane, commanding the most serious consideration, resulting in a discussion by the growers which brought out many features and facts effectively and beneficially. This discussion will appear in the April edition of "Better Fruit," consisting of about two pages.]

TO attempt to deal with the varieties of fruit and berries which can be profitably grown for the cannery would be to start an endless discussion. I shall therefore confine myself to a discussion of the varieties of fruits which can be utilized through the medium of the evaporator and a statement of the returns which the grower may be expected to realize from such products. I trust that the members of the conference may realize clearly that in attempting to make a dollar-and-cents presentation of this subject I am undertaking a task which is made extremely difficult by a number of causes. The Northwest has not thus far produced any considerable volume of any evaporated fruit other than prunes. In consequence, the prices at which other dried fruits have been marketed have been determined by the relations of supply and demand in a restricted territory, in which Northwestern producers do not come into competition with producers in other regions, and have not been primarily determined by the prices ruling in the great export markets. When our territory begins to produce annually a volume of dried fruits greater than can be absorbed by adjacent non-fruit-producing states, we shall come into competition with Eastern makers of evaporated fruits, and shall have to market our product at prices determined by the visible supplies of the country at large, not by the quantities we may have to offer. While this is not likely to result in a general and permanent lowering of the prices received, it will necessarily result in yearly fluctuation of prices between wider limits. Also, our markets for

evaporated apples in particular are chiefly found abroad, and the whole course of our export trade has been interrupted by the war, that portion of our exported fruits which would have normally been taken by Germany having been absorbed by the Allies or by the Scandinavian countries. With the close of the war there will necessarily occur material changes in the avenues of distribution of our evaporated fruits; Germany will no longer occupy the place of a middleman in our dealings with Russia, and the Pacific Coast States will be in position to compete on even terms for considerable business formerly monopolized by other portions of the United States. In the face of such a reorganization, no amount of study of past conditions in the dried-fruit industry can enable anyone to make a forecast as to the trend of prices for the next five or ten years which can be anything better than a guess, but evaporated fruits have shared in the general upward trend of prices for the past two years and there is every indication that the general level of present prices will be maintained for some years to come.

The evaporation of this surplus fruit must by no means be considered as a panacea for all the ills of the grower; while it offers very real and substantial possibilities of aid, these possibilities have, and of necessity always will have, very definite limitations. These should be very clearly understood; some uninformed or reckless enthusiasts have done much harm by statements as to the possible returns to the grower from evaporating his low-grade fruit which are very wide of the facts. Such statements create dissatisfaction with the returns obtained from materials sold to operators of existing plants and may lead to disappointment and financial loss on the part of those who are led by such statements to engage in the business. Unfortunately some of our best Northwestern horticultural journals have given circulation to such misleading articles; one such journal published an article in September, 1914, which so completely summarizes the current misinformation in regard to the profits to be realized from the drying of fruits that I must quote it in some detail by way of contrast to

the actual facts. This article states, in speaking of 20,000 tons of cull apples produced in a certain locality, that they "would make 12,000,000 pounds of dry fruit worth approximately \$1,200,000." Continuing, the statement is made that "an evaporating plant would insure growers \$16.00-\$20.00 per ton for apples and would permit of the production of a first-class article at a price under 5 cents per dried pound, or at present would pay growers operating their own plants about \$35.00 a ton for second-grade apples." By way of contrast with this glowing statement, I may state the facts, which are that 20,000 tons of cull apples would yield 250 pounds per ton, or a total of 5,000,000 pounds of dry fruit, which was worth at wholesale in the city in which this article was written 7½ cents per pound, or \$362,500. While I have no means of knowing by personal experience, I am assured by people with better opportunities for knowing that there is a very considerable difference between \$1,200,000 and \$362,500. Moreover, any grower operating his own plant who realized \$35.00 per ton from his apples would have had to find a market willing to give 14 cents per pound, instead of the current price of 7½ cents, for the dry product. The operator of a dryer paying \$20.00 per ton for evaporator stock would have been facing a cost of 8 cents for the raw material from which to make a pound of dry stock, yet the writer of this article would have him produce a first-class dry stock at a total cost less than 5 cents per pound. I shall not lead you further into the realms of frenzied finance traversed by this authority, but shall try to return to and to remain upon the solid ground of established facts. The facts are: (1) The evaporator can never compete in the normal market for apples of fancy grade; it can utilize only stock of C grade or culls. (2) The evaporator cannot profitably handle peaches. (3) The evaporator does not offer a more profitable method of disposing of entire crops of berries than is offered by the open market, under anything approaching normal conditions. (4) The evaporator offers absolutely no possibilities for the profitable utilization of vegetables. While there still exists a mar-



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Greening, Mammoth Black Twig, Stayman Winesap.

Dark stock group: Yellow Newtown, Grimes Golden, Wagener, Roxbury Russet.

Of these three groups, the first makes the very white dried stock which is demanded by the market and which bears a price somewhat in advance of that realized from the darker product made from the varieties mentioned in the second and third groups. While these last yield a slightly larger quantity of dry product, the difference is not sufficient to wholly offset the difference in price, and operators of drying plants will undoubtedly offer slightly lower prices for the dark stock groups than for the varieties of the white stock group.

The prices which the operator of an evaporator can pay for apples will primarily depend, if we disregard such details as size of plant and character of its equipment, upon the variety of fruits available for use. If the region be one which produces apples only, the working season in the plant cannot exceed eighty or ninety days at most each year, and the overhead charges—interest, depreciation and repairs, superintendence, and insurance,—will make up 20 to 22 per cent of the total cost of operation. If the district be one which supplies loganberries, raspberries, blackberries, peaches and apples, in sufficient quantities to keep the plant in continuous operation over a period of one hundred and fifty to one hundred and eighty days, the overhead charges may be reduced to 12 or 14 per cent of the cost of operation, and a corresponding increase in the prices paid for raw materials may be made. In operating upon apples, prices paid for the fruit will also depend upon whether the plant makes use of peels and cores as vinegar stock or discards them entirely. In the latter case, prices must range considerably lower than if the plant has a press and generators for the working up of vinegar stock. From one ton of culls, free from decay and of average orchard-run size, the dryer will obtain 250 to 265 pounds of dry stock, averaging "prime" quality. From the 600 pounds of peels and cores obtained from one ton of apples there will be made 45 gallons of vinegar stock, while the 200 to 250 pounds of pomace remaining will have a feeding value very nearly equal that of a good quality of corn silage and will well repay the labor required to place it in the silo. At prevailing prices, the operator will have 250 pounds dry fruit, at 6½ cents, \$16.25; 45 gallons vinegar stock, at 5 cents, \$2.25, a total of \$18.50.

Against this amount there must be charged the cost of manufacture, packing and marketing. If the district were one engaged in general fruit growing to such an extent that the plant could be kept in operation from mid-July to mid-December, the manufacturing and marketing costs for apples might easily be kept to 2.2 cents per dry pound, or \$5.50 per ton of fruit used. If the plant operated only upon apples and consequently for a 60 or 90-day season, man-

Continued on page 31



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for 1917, Secrets of Fruit Profits, **FREE**—just off the press. Crammed with money-making facts—life photos of fruits in natural colors—tells how orchardists have grown rich. Learn how they got \$12 per barrel for apples and \$2.70 per crate for peaches. **Stark Trees** **FREE**
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ket for small quantities of dried vegetables, as cabbage, turnips, onions, celery, spinach, and tomatoes, this market is becoming more contracted every year, and dealers in such products annually find greater difficulty in disposing of the output.

The evaporating plant must therefore be regarded strictly as a means of utilizing (1) unmarketable grades of the better commercial varieties of apples; (2) varieties of apples, regardless of grade, which cannot profitably be marketed fresh or which it may become necessary to withdraw from the markets and from competition with standard varieties; (3) prunes, cherries and apricots; (4) berries of certain varieties; (5) peaches of lower grades. The evaporator cannot and must not be regarded as a catch-all for any and all varieties of any fruit. The cannery can make use of a very much wider variety of fruits than it is possible to handle in the drying plant, which cannot make any use of some of the varieties which are most desirable for canning, simply because no demand for these fruits, as dried products, exists, either in the domestic or the foreign markets.

APPLES

It is not profitable to attempt to make use of summer varieties of apples in the evaporator, nor can windfalls and immature fruit of autumn and winter varieties be utilized except at very low prices. The yield of dry product from summer varieties and from immature fruits is low, drying must be considerably more complete than with mature fruit, and the stock is inferior in quality, readily susceptible to spoiling outside cold storage, and bears very low prices in the markets. All varieties of late autumn and winter apples, when mature, may be used, but as the business is extended and systematized these varieties will undoubtedly be classified into three groups, in the order of their desirability for drying purposes. These groups will be determined primarily by the color of the dry stock which can be made therefrom, and the principal varieties of each group will be the following:

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Suggestions for Control of More Serious Plant Diseases

By Leroy Childs, Entomologist and Plant Pathologist, Hood River Branch Experiment Station

[EDITOR'S NOTE.—"Better Fruit" has published in previous years the methods of control for plant diseases, as recommended by the state experiment stations in the Northwest, and spray calendars. While it is generally true that the methods of control and the remedies used are nearly the same in the different sections, it is important that the fruit growers should bear in mind that in different sections and under different climatic conditions the dates of the different sprayings, the number of the different sprayings and the strengths vary to a greater or less extent. Therefore fruit growers should not adopt this program for their particular sections without interviewing their own experiment stations or their consulting horticulturists. Particular attention is called to the fact that while three sprayings for codling moth are generally ample in Hood River districts, in some districts four or five are frequently considered necessary. Growers are cautioned to use care and judgment in the application of lime and sulphur, both as to strength and the weather conditions at the time of application, as more or less burning is apt to occur from the application of lime and sulphur if applied late in the year when the weather is becoming extremely warm.]

Apple Scab.—At the present time no more satisfactory recommendation can be given for the control of apple scab than that outlined for the past season, which includes five applications of lime-sulphur, dilutions of which are reduced as the season progresses.

Several new features were included in experimental work directed toward the control of scab during the past year. These include the experiments pertaining to the following: First, the dusting of trees instead of spraying for the control of both scab and codling moth; second, the consideration of greater dilutions of lime-sulphur than at present used in the many sprays for controlling scab; and, third, substitutes for lime-sulphur in the latter spray, in order to avoid injury from burning. Considerable time has also been given to the study of the life history of this disease, and its relation to our present control measures. Much valuable data have been obtained in these various fields of endeavor. The work is not sufficiently completed or tested, however, to warrant drawing conclusions at this time.

The following program will not only be found effective in controlling this disease, but it is so arranged that by combining other ingredients with the lime-sulphur powdery mildew, codling moth, brown and green aphids can be readily controlled at the same time. Of the list of sprays that are included in this program it will not be necessary in all cases to use the materials present, as some of the orchards are free from some of the pests mentioned. Before it is time to put on the application recommended, the orchardist should determine whether his orchard contains the pest or not.

Powdery Mildew.—From the experimental work which has been in progress now for a year, and which is still not completed, it is safe to say that up to the present time control measures in Hood River have not been attempted early enough to bring about entirely effective results. The disease becomes active shortly after the semi-dormant period, blighting from that time on, fruits spurs, terminal growths and

foliage. In the work which has been conducted, several combinations have been used during the past season, the most effective of which has been found to be iron sulphide mixture used at the rate of 10 gallons of the mixture to 100 gallons of water. Atomic sulphur, used at the rate of 12 pounds to 100 gallons,

was observed to be fairly effective, but did not reduce the disease to the extent that did the iron sulphide mixture.

Last year the disease was kept under control with four applications, iron sulphide being used in the first four scab sprays. These are the recommendations given in the spray program. The

TABLE V.—SPRAY PROGRAM FOR THE CONTROL OF INSECT PESTS AND PLANT DISEASES OF THE APPLE.
(This is adapted chiefly for Hood River conditions.)

Application	Insect and Plant Disease	Materials and Time of Application
1. Miscible oil	Leaf roller San Jose scale Brown aphid	<i>For Leaf Roller:</i> Miscible oil 6-100. Use only in orchards where leaf roller control is desired or where San Jose scale is serious. This application should be made under warm, settled weather conditions only. (See article Hood River Experiment Station Bulletin.)
2. Delayed dormant	Apple scab Mildew Brown aphid	<i>For Scab:</i> Lime-sulphur, 32°, 1-20.* <i>For Mildew:</i> Add iron sulphide mixture 10-100.† <i>For Brown Aphid:</i> Add tobacco (nicotine sulphate) 1-1200. This spray should be applied at time first leaves are unfolding about the bud clusters on the fruit spurs.
3. Pink application	Apple scab Mildew	<i>For Scab:</i> Lime-sulphur 32°, 1-25. <i>For Mildew:</i> Add iron sulphide mixture 10-100. This application should not be made until the fruit has separated in the clusters, otherwise the entire surface of the young developing apple cannot be completely covered.
4. Calyx application	Apple scab Mildew Codling moth	<i>For Scab:</i> Lime-sulphur 32°, 1-35. <i>For Mildew:</i> Add iron sulphide mixture 10-100. <i>For Codling Moth:</i> Add lead arsenate 4-100, paste. Use 2½-100 of powder. Apply after petals fall.
5. Ten day application	Apple scab Mildew	<i>For Scab:</i> Lime-sulphur 32°, 1-40. <i>For Mildew:</i> Add iron sulphide mixture 10-100. This should follow the calyx application within ten days or two weeks.
6. Thirty day application	Apple scab Codling moth (and possibly) Green and Woolly aphid	<i>For Scab:</i> Lime-sulphur 32°, 1-40. <i>For Codling Moth:</i> Add arsenate of lead 4-100. <i>For Green and Woolly Aphid:</i> Add tobacco (nicotine sulphate) 1-1200. Apply thirty days after calyx application. Great judgment should be used in making this application in order to avoid possible spray injury. Avoid drenching. Do not apply lime-sulphur during hot weather, or if hot weather is anticipated within ten days or two weeks. Before spraying the advice of the nearest pathologist should be obtained. This is not a good combination for all four pests considered. Lime-sulphur should be used very lightly in order to avoid injury, while the insecticides should be used in larger amounts. If aphids are bad these should be applied separately.
7. July spray	Green and Woolly aphid	<i>For Green and Woolly Aphid:</i> Tobacco (nicotine sulphate) 1-1200; soap 3 lbs.-100 gallons. This spray should be used only in case orchard is found infested with either or both these insects.
8. Third codling moth	Codling moth Anthracnose Late scab	<i>For Codling Moth:</i> Arsenate of lead 4-100. <i>For Anthracnose:</i> Add bordeaux 3-4-50. Date of this application is dependent upon the seasonal development of the codling moth and will be recommended from the local experiment station.
9. Fall application	Anthracnose	<i>For Anthracnose:</i> Bordeaux mixture 6-6-50. To be applied as soon as the apples are harvested.

* See dilution table for lime-sulphur at different degrees Beaume.

† See method of preparation of this mixture in accompanying article.

TABLE VI.—DILUTION FOR LIME-SULPHUR AT DIFFERENT DEGREES BEAUME.
Prepared by Mr. R. H. Robinson, Assistant Chemist, Oregon Experiment Station.

Degrees Beaume	Delayed dormant spray	Pink spray	Calyx spray	10 day spray	30 day spray
36.....	1 to 22.7	1 to 28.3	1 to 40.0	1 to 45.6	1 to 57.4
35.....	1 to 22.0	1 to 27.5	1 to 38.8	1 to 44.2	1 to 55.6
34.....	1 to 21.3	1 to 26.7	1 to 37.5	1 to 42.8	1 to 53.7
33.....	1 to 20.7	1 to 25.8	1 to 36.2	1 to 41.3	1 to 51.9
32.....	1 to 20.0	1 to 25.0	1 to 35.0	1 to 40.0	1 to 50.0
31.....	1 to 19.4	1 to 24.2	1 to 33.7	1 to 38.6	1 to 48.2
30.....	1 to 18.7	1 to 23.3	1 to 32.3	1 to 37.1	1 to 46.4
29.....	1 to 18.0	1 to 22.5	1 to 31.0	1 to 35.6	1 to 44.5
28.....	1 to 17.3	1 to 21.6	1 to 29.7	1 to 34.2	1 to 42.7
27.....	1 to 16.6	1 to 20.8	1 to 28.3	1 to 32.8	1 to 41.0
26.....	1 to 16.0	1 to 20.0	1 to 27.0	1 to 31.3	1 to 39.0
25.....	1 to 15.4	1 to 19.1	1 to 25.7	1 to 30.0	1 to 37.2
24.....	1 to 14.7	1 to 18.3	1 to 24.3	1 to 28.7	1 to 35.4
23.....	1 to 14.0	1 to 17.4	1 to 23.0	1 to 27.2	1 to 33.5
22.....	1 to 13.3	1 to 16.5	1 to 21.6	1 to 25.8	1 to 31.7
21.....	1 to 12.6	1 to 15.8	1 to 20.3	1 to 24.5	1 to 30.0
20.....	1 to 12.0	1 to 15.0	1 to 19.0	1 to 23.0	1 to 28.2

This table was prepared considering lime-sulphur at 32° Beaume as a standard. Concentrates testing higher or lower are arranged so that they will contain the same amount of sulphur in the diluted spray.

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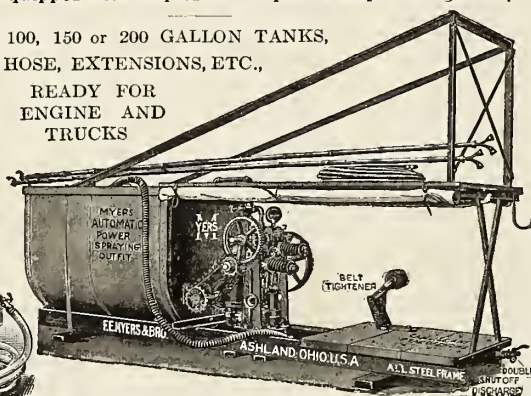
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iron sulphide mixture is made as follows: Take 10 pounds of iron sulphate (copperas), suspend it in a sack well toward the top of a 50-gallon barrel which contains about 40 gallons of water and allow it to dissolve. As soon as the copperas becomes dissolved, add about 3 gallons of lime-sulphur solution. A black precipitate immediately forms. The solution should be allowed to settle for two to six hours. In order to determine whether all of the sulphide has been precipitated, place a little of the clear liquid from the top of the barrel in a tumbler and add a few drops of lime-sulphur concentrate. If a black residue forms by adding the lime-sulphur, then add about one-half gallon more lime-sulphur concentrate to the barrel and stir again. After it settles, test again, and add more lime-sulphur to the barrel if a precipitate is formed when lime-sulphur is added to the clear liquid. If no further precipitation occurs upon addition of the lime-sulphur, drain this top liquid off by siphoning down to the black muck.

The clear liquid is of no use and should be thrown away. Fill the barrel containing the black muck and

allow it to settle. Again drain off the clear liquid, fill the barrel full of water and stir. This is now ready for use. Ten gallons of this black liquid will make 100 gallons of diluted spray. In view of the fact that the sulphide settles very rapidly, always stir up the materials in the barrel before dipping out the material to make the diluted spray.

Anthraco-nose.—The handling of the large crop of apples during this past year, combined with the early rain, prevented the greater majority of orchardists from applying the anthrac-nose spray during the fall of 1916. This disease will therefore probably be prevalent in the Hood River Valley during the coming year. No orchard in which bordeaux mixture was omitted in 1916 should go unsprayed this fall, for the results may become very serious.

Quite often, as was the case this year, it is practically impossible to get the spray on the trees after the harvest, owing to the occurrence of early rains. For this reason bordeaux 3-4-50 should be added to the last codling-moth spray, the date of application depend-

ing upon the development of the insects. This should usually be made between August 10 and 25. Experimental work carried on during the past two years has demonstrated that this material can be used at this time with safety to the apples. If applied thoroughly, it is of great value in preventing early anthracnose infection, which may result from rains occurring before the fruit is picked. Under ordinary conditions this spray will keep the disease well in hand in orchards comparatively free from the trouble. Seriously infected orchards, however, should not only receive this summer application, but the regular fall bordeaux mixture 6-6-50, which should be applied as soon as the fruit is picked.

Pear Fire Blight.—The outbreak of fire blight which occurred in several sections of the valley last year should serve as a very distinct warning to all orchardists that they be on the alert for a return of this disease in the future.

The value of maintaining a careful watch for this most serious trouble cannot be over-emphasized. Unless orchardists take more interest in the future than they have shown in the past, the disease will cause more trouble than all of the rest of the insect pests and plant diseases that demand attention at the present time. This disease is caused by a bacterium which attacks all parts of the tree—blossoms (known as blossom blight), twig blight (that of killing and blackening of vigorously growing terminals), and body blight. The disease in the latter form attacks the limbs and trunks, forming large cankers, and ultimately girdling and killing the tree.

All suspected cases of blight should be reported to the county fruit inspector before control is attempted.

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This will assist the proper authority to determine areas of infection and enable him to eradicate the trouble with greater ease. Fire blight can only be controlled by cutting out the injured parts. Tools should be disinfected before and after making each cut in order to avoid the further spreading of the disease by these instruments. Corrosive sublimate, which can be obtained at any drug store, should be used at a dilution of 1 part to 1000 parts of water.

Pear Bark Blister.—During the past year many pear trees were observed possessing more or less well-defined cankers upon the larger limbs and body. The cause of this destruction of tissue has not been determined, but winter freezing is suspected to be the chief cause for the formation of these injured areas. No disease has been isolated from these places. Anthracnose has been found in several cases, but infection from this disease is not as a rule prevalent upon the pear. Spraying for the control of this disease upon pears is the same as for apple.

The writer has examined many cankers during the past fall, and has found that a great majority of them are rapidly healing over. Those so doing should be left alone until recovery is complete. In the case of large body wounds, where a large amount of heart wood is exposed, the application of a good coating of white lead paint is suggested in order to reduce the possible entrance of heart-rot organisms to a minimum until the bark is completely healed over. This application should be repeated two or three times a year. The use of white lead and raw linseed oil is recommended.

Pear Scab.—Though a different organism pear scab closely resembles apple scab in appearance and method of attacking the fruit. Its control is much the same as that of apple scab. In orchards which have suffered losses from this disease, the program given for the control of apple scab will be found effective.

California Peach Blight.—During the past two or three years California peach blight has become very prevalent at Hood River and the surrounding country. This disease, together with peach-leaf curl, is killing many peach trees. The fungus attacks twigs, buds, foliage and fruit. In the case of the old branches and twigs, irregular cankers are formed, from which a thick

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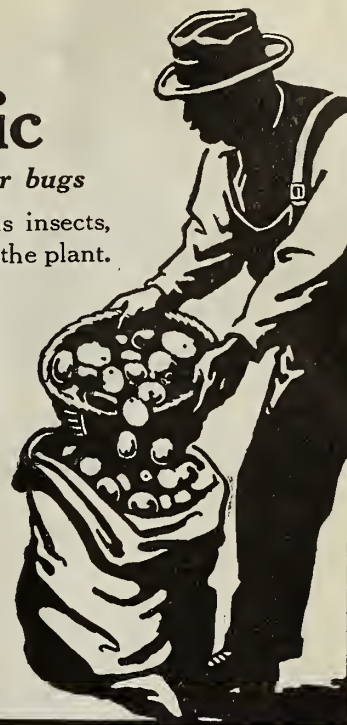
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768 Woolworth Bldg., New York

Watsonville, California

gum exudes. Infections on the newer growth are at first red, or reddish brown in color, changing with the destruction of the tissues to a dark brown color, eventually forming a small black canker. These cankers often completely girdle small twigs, resulting in their death. Infection also very often occurs on the fruit, and if sufficiently extensive, destroys the marketability of the product. Reddish brown spots occur upon the skin of the fruit from which exude long, semi-transparent threads of gum. The fruit of the apricot is often attacked and becomes

badly deformed, owing to the infection caused by this disease. On trees badly infected large numbers of the fruit and foliage buds are destroyed during the fall and winter.

Peach blight can be controlled by pruning and proper spraying. In the case of the older trees, a large portion of which is diseased and partly dead, heavy cutting should be resorted to in order to develop new wood and bearing surfaces. In connection with this work, the trees should be sprayed at least three times a season in order completely to protect the new wood from



Speaking of Arsenate of Lead

*One of the largest and most thorough
orchardists of the entire West says:*

(Name and address on request)

"Have made tests of practically all other brands, but have always returned to Grasselli with considerable satisfaction because:

"First—It remains in suspension better than others.

"Second—It leaves no residue in the tank.

"Third—It seems to stick to the fruit, while other brands seem to wash off.

"Fourth—It kills the worms.

"It is almost impossible to find a wormy apple on any of my ranches. Less than 1% will cover all my losses in that respect."

IT WILL DO YOUR WORK EQUALLY WELL.

Twelve years of unvarying, successful and satisfactory use throughout the Northwest. Always uniform, dependable and effective.

The Fruit Growers' Standards:

**Grasselli Arsenate of Lead Paste—Grasselli Arsenate of Lead Powdered
Grasselli Sulphate of Nicotine, 40%**

THE GRASSELLI CHEMICAL CO.

Established 1839

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TORONTO

DETROIT
MILWAUKEE
ST. LOUIS

PITTSBURGH
NEW ORLEANS
BIRMINGHAM

MONTREAL

as soon as the leaves begin to show, and sprays applied after that date are useless.

Winter Rhubarb

In the winter time when fresh vegetables are not in the market in the Northwest, except those that are brought in from California, on which prices are usually very high on account of freight rates, it is a good idea for the fruitgrower and farmer to have some winter rhubarb, a variety of rhubarb which thrives well under ordinary winter conditions, providing a supply of this excellent vegetable. In addition to its value as a fresh vegetable to the fruitgrower it can be grown and sold on the market at very satisfactory prices, ranging from 75 cents to \$1.50 per box of thirty pounds, which pays pretty good prices to the producer.

Mr. White of the Northwestern Fruit Exchange, early in January, announced that 80 per cent of all cars of apples shipped by the Northwestern Fruit Exchange to January first had been paid for in full to the shipper. Checks were mailed to the shippers on an average of 29 days after the shipment had been made. Quick action like this in getting returns certainly is a big factor in satisfying the grower.

The Brewster District Unit was first in the field with the closing of Jonathan and King David pools, and are now out with final figures on the Delicious pool. The prices, net to the Unit, are as follows:

Extra Fancy—	Boxes	Price
36s-38s	3,494	\$1.558
96s-125s	1,201	1.458
138s and smaller	222	1.358
Fancy—		
36s-38s	1,348	\$1.258
96s-125s	554	1.158
138s and smaller	147	1.058

Ray Tedford, one of the trustees of the Brewster Unit, commenting on these figures, says: "These figures are highly gratifying to our growers. Most of our extra fancy was packed under the "Skookum" brand and the figures shown are absolutely net to the Unit after deducting all advertising and selling expenses."

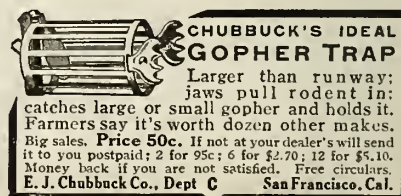
Apples shipped and in storage January 1st, 1917, in the State of Washington, are approximately as follows:

	Shipped	Unshipped
Yakima	5,833	1,568
Wenatchee	6,249	1,082
Spokane	700	60
White Salmon-Husum....	91	
Walla Walla	419	5
Total No. cars shipped..	13,292	
Total No. cars unshipped		2,715
1916 commercial apple crop, cars		16,007

infection. The fungus is active during a greater part of the year. On this account it is necessary to spray in the fall in order to protect the trees from infection, which occurs during the rainy weather. Either bordeaux 6-6-50 or lime-sulphur 1-15 will be found effective in combating the disease at this time. The first application in the spring should be made just before the buds burst. This application will control leaf curl as well. Lime-sulphur 1-10 is suggested. It has advantages over bordeaux, since, if there are any scales present, these will also be destroyed. The second spring application should be applied to the affected trees when the fruit is about the size of a pea. Atomic sulphur, used at the rate of 8 pounds to 100 gallons, is suggested

for this application, or self-boiled lime-sulphur used at the rate of 8 pounds of lime, 8 pounds of sulphur to 50 gallons of water. Lime-sulphur concentrate should not be used at this time, as it will cause a decided defoliation.

Peach-Leaf Curl.—Peach-leaf curl, when it is left unattended, does a great deal of damage in the Hood River Valley. A parasitic fungus causes this disease. The leaves become over-sized, thickened, twisted, and eventually drop prematurely without performing their proper function. Quite often the trees are defoliated two or three seasons in succession, with the result that the trees become greatly devitalized. This disease is easily controlled by spraying with lime-sulphur 1-10 before the buds burst in the spring. Infections occur



The Length of Ascospore Activity

By Leroy Childs, Entomologist and Plant Pathologist, Hood River Branch Experiment Station

FROM investigations carried on during the past three years relative to the control of apple scab in the Hood River Valley, Oregon, it has been found that the so-called "pink application" or cluster-bud application as used throughout the Eastern States as the first scab spray is not sufficiently early to obtain complete control of the disease. Jackson and Winston (1) in their investigations of 1914 at Hood River failed to

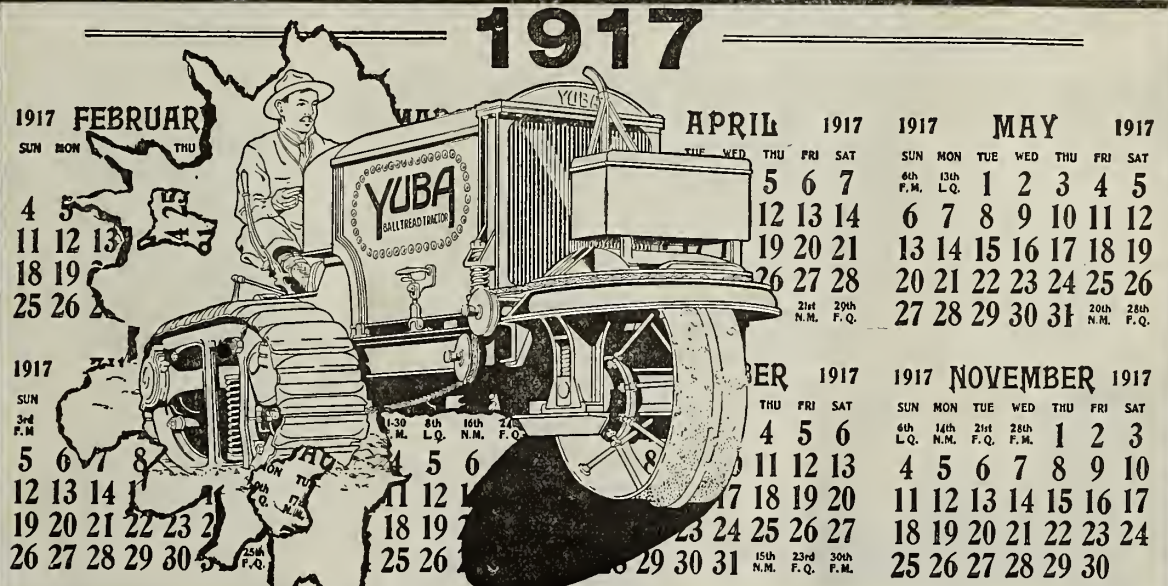
control scab owing to the fact that serious infection occurred before they made their first or cluster-bud application.

In 1915 Mr. J. R. Winston and the writer continued the investigations relative to the control of this disease. Mature ascospores were observed in the field about the middle of March. In order to determine whether a spray earlier than the "pink application" was

necessary all of the experimental plots were divided in two parts; one-half received the so-called "delayed-dormant" application and in the other half the first spray was applied in the "pink" or cluster-bud stage. Subsequent applications were identical in both sections. In every experiment much better control of the disease was obtained on the trees which received the early spray. In some of these a difference in the control of scab of fully fifty per cent occurred.

In view of the fact that little is known concerning the life history and

1917



1917 FEBRUAR

SUN	MON	TUE	WED	THU	FRI	SAT
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

1917 MARCH

SUN	MON	TUE	WED	THU	FRI	SAT
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

1917 APRIL

SUN	MON	TUE	WED	THU	FRI	SAT
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

1917 MAY

SUN	MON	TUE	WED	THU	FRI	SAT
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

1917 JUNE

SUN	MON	TUE	WED	THU	FRI	SAT
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

All the year around tractor

THE SPRING RUSH is the busy season for Yuba tractors—no time for adjustments, not a moment to be used in making repairs. The busy plowing season is a test of the stamina and sturdiness of the Yuba.

But no matter how successfully a tractor comes through this endurance test, it is not necessarily a good investment. The spring plowing season does not last long.

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The Yuba meets these conditions. It is an all-year-around tractor. It combines sturdiness and versatility. It replaces all your horses.



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Gentlemen: Kindly send me catalog and prices on the Yuba Ball Tread Tractor.

I am interested in Model 12-20 _____ Model 20-35 _____

Name _____

Town _____ State _____

P. O. Box _____ Size of farm _____

(Check main crop raised)

____ Fruit _____ Rice _____ Grain

____ Grapes _____ Hops _____ Alfalfa

and there have just been issued new Pump and Plow Catalogs which we will be glad to send prospective buyers.

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Known Wherever Good Fruit Grows The World Over

Bean Power Sprayers break the liquid up into a fine mist and drive the spray material onto the trees at tremendous pressure—so that it reaches every crack and crevice—and does the work thoroughly and completely.

Hundreds of Orchardists throughout the Northwest use the Bean because they know that Bean spraying insures a big healthy yield of profitable fruit.

Bean Power Sprayers have ten big exclusive features not found on other sprayers—the results of over thirty years' experience in the manufacture of spraying machinery.

INVESTIGATE THESE BIG FEATURES BEFORE YOU DECIDE ON A SPRAYER

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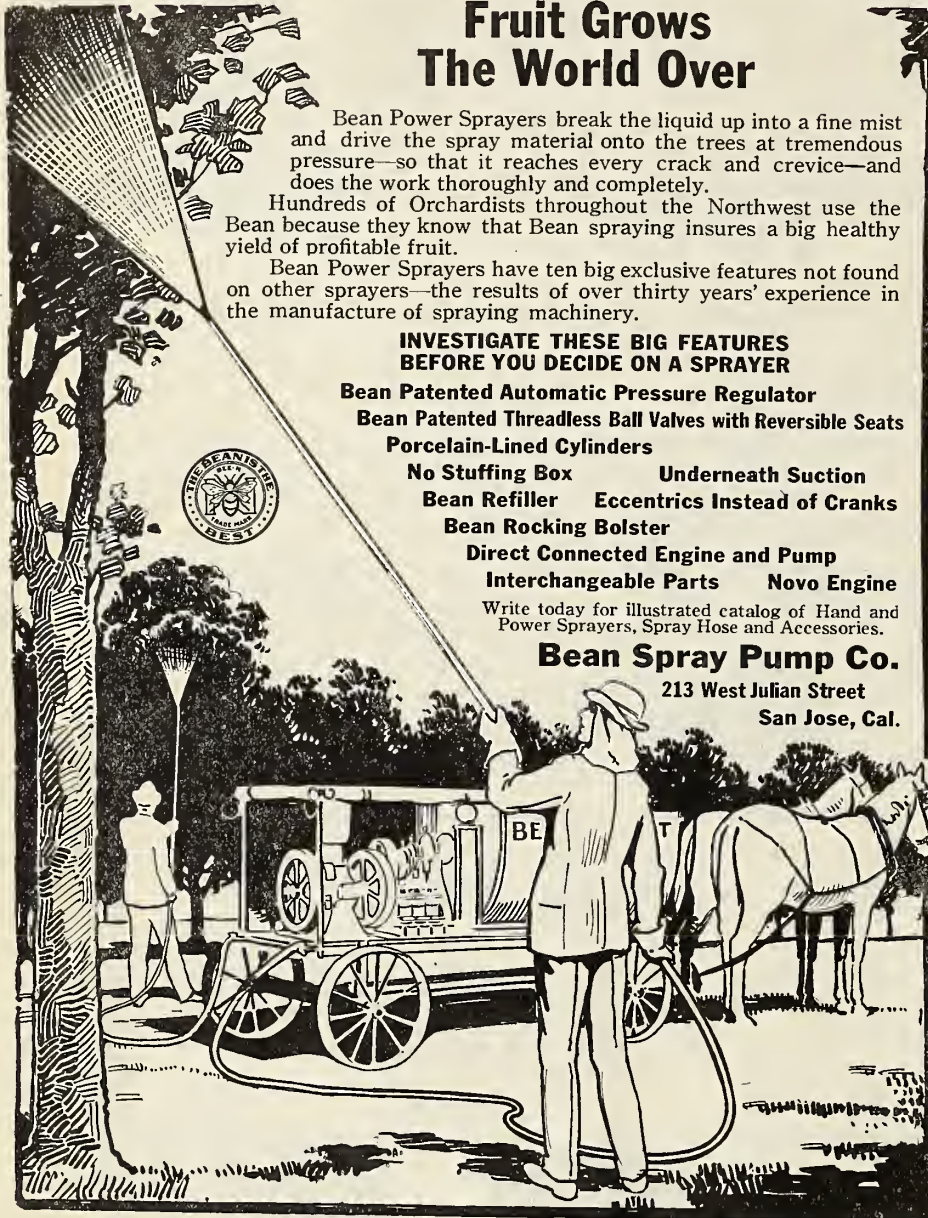
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Write today for illustrated catalog of Hand and Power Sprayers, Spray Hose and Accessories.

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behavior of this apple disease in the West a careful study of the ascospore activity (the source of primary spring infection) was carried on by the writer in 1916. The investigation definitely proves that an application is very essential in this locality before the "pink application" in order to keep the disease in check.

The observations were carried on in the field under normal orchard conditions. Ordinary microscope slides, upon which a little glycerine jelly was applied, were placed over leaves bearing scab infections. The slides were examined daily for a period of more than three and one-half months. It was found that the spore discharge from the fallen leaves began much earlier and extended over a much

longer period than has been previously reported. The first spores were observed to be discharged on March 20. At this time fruit buds in early varieties of apples were just beginning to burst; in later varieties no green tissue was present. The last ascospores obtained was on June 27, or more than three months later than the initial discharge. The records that have been obtained show the correlation existing between discharge and the weather conditions occurring during this period.

This ascospore activity has a very direct bearing upon the control of apple scab and it seems quite possible that in other sections, during some seasons at least, ascospores are discharged at a much earlier date than supposed, and which has resulted in occasional

years of very poor scab control. A complete report of this investigation will be published in the near future.

The Southern Pacific Company is sending out an announcement made by the president, William Sproule, who has just returned from New York, that plans have been made for the Southern Pacific Company to build all its wooden freight cars, such as box cars and flat cars, at their own shops, and that they will be made from lumber produced along the lines of the Southern Pacific. The policy is to favor the lumber industry of the Pacific Coast. They further state in the near future, as soon as possible, they will build 2,000 box cars, 450 stock cars, 500 flat cars, which, added to 2,700 new refrigerator cars just ordered by the Pacific Fruit Express Company, of which 1,000 will be built in California, will give the Southern Pacific Company 5,650 new freight cars during the coming season. This should be very interesting information for the fruitgrowers and farmers, particularly after the recent car shortage of the past season.

The Ninth National Apple Show held in Spokane, November 20th to 25th, featured more prominently than ever before the Growers' Conference, in which many of the vital problems of interest to the fruitgrowers were discussed thoroughly and instructively. Many of the addresses, with discussions following, contained very valuable information. Practically all of the papers with the discussions will be given in future editions of "Better Fruit," as space will permit. These will appear in "Better Fruit" at opportune times in advance of the season when the different subjects will command the growers' attention.

F. E. Myers & Bros., Ashland, Ohio, one of the large manufacturers of spray outfits, are showing their interest in their employes by recently taking out insurance policies covering all their employes.

By-Products Plant Wanted

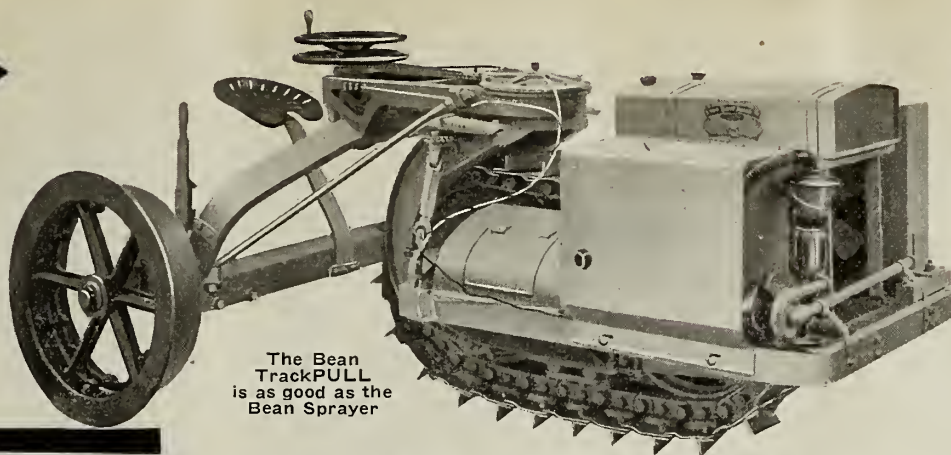
Editor Better Fruit:

The people of Lewiston Orchards are desirous of finding some way to prevent the immense waste of cull fruit that has thus far prevailed in this district, and hereby appeal to you, as the publisher of the leading fruit journal in the Northwest, to aid them in giving publicity to their needs in the matter.

This is a district having over 5,000 acres of planted apple orchards, more than one-half of which are already in bearing, the oldest being now in their eleventh year of growth. The cull apples from the present year's crop are estimated at 2,500 tons. Last year, with about the same amount of cull fruit, the greater part went to waste from lack of by-products facilities. Some portion was shipped to outside points, but this necessitated a haul of from four to eight miles to the cars, which are reached by a paved highway leading from Lewiston through the district.

The situation seems favorable for the immediate establishment here of a vinegar factory, an evaporating plant and a cider manufactory. It is believed that the growers would largely join in any movement that appeared to be upon a sound basis, and which afforded them a controlling interest. They would be pleased to receive propositions from parties who are prepared to organize and operate such plants of the right kind. Any further information wanted as to the situation will be given upon request. Your truly, H. H. S. Rowell, for Lewiston Orchards Assembly, Lewiston, Idaho.

Does the
Work of
Six Horses



The Little
King
of Orchard
Tractors

The Bean
TrackPULL
is as good as the
Bean Sprayer

ORCHARDISTS—LOOK

The Wonderful Little Bean TrackPULL Six-Horse Tractor

The Bean TrackPULL combines giant strength with light weight and long traction. Just think of a tractor so small that it will go under limbs only 4 feet off the ground and will work right up close to the trees and between anything that grows in rows only 7 feet apart.

That's what the Bean TrackPULL does. It will do your plowing, your cultivating and your discing, and then run stationary machinery when it is not working in the field.

It actually does the work of six horses on what it would cost you to feed one team, and you can work it 24 hours a day if you want to.

The Ideal Orchard Tractor

The Bean TrackPULL plows or cultivates closer to trees than a team. Makes little difference how far off center you hitch. Goes under the branches of trees no team can get under—turns inside of a 10-foot circle.

It will save you money by saving you cost of man labor and by doing more and better work in less time than it takes for horses to do it. It will do your heavy work when you want it done. It will not be affected by heat or insects. It will cultivate deep in hot weather.

Costs nothing to maintain when idle. Furnishes a large unit of power at your command day or night.

The Bean TrackPULL pulls instead of pushes itself along. It lays its own track on which it pulls. This wide track offers much less resistance than a rear drive tractor that sinks in and packs the soil.

The TrackPULL packs the soil less than a man's foot when he walks, and is therefore especially adapted to cultivating. It has full power on turns as well as on the straightaway.

Best Construction—Lasts Longest

The Bean TrackPULL Six-Horse Tractor is built in one size only—6 h.p. at drawbar and 10 h.p. at belt—and weighs only 2,875

pounds. The construction (covered by basic patents) permits greater traction with lighter weight, and light weight means low operating cost and ease in handling.

The motor is a Le Roi 4-cylinder vertical type—4 cycle. Equipped with Donaldson air clarifier—Bosch ignition—Water cooled with centrifugal pump, also fan. Combination pump and splash lubricating system.

The famous Hyatt roller bearings used in track wheel and sprocket and in track rollers. There are six New Departure ball bearings in the transmission. Running in grease and dustproof. Gears are steel. Not a plain bearing in entire transmission.

Prompt Deliveries in April

We are behind on orders and are working night and day. We have started work on a large addition to our plant to increase our capacity and will be able to make prompt shipments in April.

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We will gladly send you our folder telling you more about the Bean TrackPULL Six-Horse Tractor, and what it will do for you.

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San Jose, California.

Please send me prices and the big folder with the complete story of the BEAN TrackPULL.

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HOOD RIVER, OREGON

Official Organ of The Northwest Fruit Growers' Association
A Monthly Illustrated Magazine Published in the
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All Communications Should Be Addressed and Remittances
Made Payable to

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In the United States, \$1.00 per year in advance	
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ADVERTISING RATES ON APPLICATION	
Entered as second-class matter December 27, 1906, at the Postoffice at Hood River, Oregon, under Act of Congress of March 3, 1879.	

The Importance of Tractors.—A few years ago when the crop of apples in the Northwest was comparatively small and prices relatively high, very little attention was paid to the matter of economy in the cost of production or harvesting. In 1910, when the Northwest apple growers had the first jolt in the way of lesser prices, the editor realized that the high prices realized in previous years would not continue to maintain. The editor started the ball rolling with investigation on this subject, pertaining particularly to harvesting, publishing an editorial on that subject in December, 1910, showing his own harvesting cost to be 41½ cents per box, which commanded universal attention and resulted in many growers introducing methods of efficiency, including grading machines, so that the cost has been greatly reduced. In 1915 the editor's cost was reduced to 31.97 cents per box, which seemed to be a pretty fair general average. The movement resulted in the reduction of about 25 per cent, or about 9 cents per box. This movement created interest in other features, in the cost of production. A little over a year ago Professor C. I. Lewis, Horticulturist, Oregon Agricultural College, published a most excellent bulletin, entitled "The Economics of Orchardling," including in this cultivation. In June, 1915, Mr. Langdon, of the Langdon-Baker Orchard of Walla Walla, Washington, contributed an article on the "Economy of Tractors in Connection With Cultivation." Since then tractors have commanded considerable attention on the part of orchardists, more particularly the large orchardists, it having been ascertained that by the use of tractors the cost of cultivating can be materially reduced. Equally important with reduction of cost in connection with cultivation is the fact that in the spring the soil dries out very rapidly; therefore cultivation must be done quickly in order to con-

serve the moisture, particularly in districts which are not amply supplied with irrigation water, in order to keep the fruit crop growing throughout the season. The moisture condition is far more important in orcharding than in most kinds of farming, because a large number of farm products grow into maturity early in the summer before the moisture is completely exhausted, whereas apples practically continue to grow throughout the entire summer, in fact up to harvesting time in October and November. Tractors present a solution of the problem of cultivation in two ways, reducing the cost and enabling the fruitgrower to do his cultivating in a short space of time, conserving the moisture thoroughly and quickly, leaving the balance of the fruitgrower's time to be devoted to spraying and other important orchard problems that come along throughout the entire season. The minimum unit or acreage which will justify investing in a tractor has not been definitely ascertained, so far as the editor knows. Of course it must be admitted the cost on a small acreage would be excessive, consequently it seems well to suggest that, whereas community graders and community packing houses have been successful in not only reducing the cost of packing, but resulting in a more uniform packing, it looks reasonable to suppose that a community plan in reference to tractors would be practical and successful. We fruitgrowers realize the necessity of economy in production in every way possible. Now that the matter of economy is well under way on the cost of harvesting, the editor suggests that the fruitgrowers endeavor to introduce more economy methods pertaining to cultivation and other problems.

Advertising the Apple.—The success obtained by the Northwestern Fruit Exchange in advertising the Skookum brand in 1914 was so satisfactory that the fund was increased for 1915. Again, even more satisfactory results were obtained and the 1915 campaign being so successful that the Northwestern Fruit Exchange created a fund of somewhere in the neighborhood of \$75,000 for the 1916 campaign, which proved the value of advertising beyond any argument. In 1915 the Hood River Apple Growers' Association put on a moderate advertising campaign, the result being so satisfactory that the Board of Directors felt justified in recommending a more comprehensive campaign for 1916, amounting to approximately \$30,000. This campaign for Blue Diamond brand has been carried on principally in New York City, San Francisco and Los Angeles, comprising newspaper advertising, street-car advertising, booklets, receipt books and calendars. The results of the Northwestern Fruit Exchange advertising and the Hood River Apple Growers' Association advertising in the year 1916 have been so effective in creating a demand for these popular brands that all those who have kept well informed feel justified in this progressive movement of creating a wider demand,

it being a well-known fact that a strong demand means firmer prices. By that is meant firm prices under existing market conditions, taking into consideration the effect of the natural law of supply, demand, competition, etc. The Yakima Fruit District Association has been watching the advertising campaign that has been carried on during the past two or three years very closely, and at a recent meeting took steps to create a fund for advertising by making a charge of 5 cents per box to advertise the "Y" brand throughout the United States. These three concerns and the North Pacific Fruit Distributors handle the largest tonnage of any of the marketing organizations in the Northwest. Their experience and judgment therefore should be very convincing. There is no getting around the fact that an immense demand has been created by advertising for many brands of articles and products. Advertising has been tried out and proved successful for Northwestern brands of apples to such a degree and so successfully that the fruitgrower should be willing to contribute a reasonable sum per box for the purpose of creating a still wider demand and a greater consumption, both of which mean firmer prices and generally better prices.

Zero Cold Test for Motor Oils.—A very interesting article on this subject has been prepared by P. R. Melchert, automobile engineer of the Standard Oil Company. The space in "Better Fruit" is limited. The vital problems connected with fruit growing usually take up so much space that many other important articles must necessarily be condensed. The main features in the article are that the users of motor oils on automobile engines and machinery which are operated in cold climates should first use an oil that will stand a cold test, in accordance with the climate in which they operate. If an oil has a cold test of 30 degrees it will pour at that temperature, but becomes solid at about five degrees lower. Oils that congeal when the weather is at freezing are therefore not suitable for lubricating purposes where such temperatures prevail. Every man operating an engine knows that it starts hard in cold weather, which is due to the fact that the fuel does not vaporize as readily during the cold weather as it does during the warm. This condition taxes the light batteries to their limit. If an oil is used that makes a poor cold test an additional power is necessary to turn the motor over, which is a constant drain upon the batteries, meaning an expensive upkeep. If an oil is used with an insufficient cold test it will not lubricate the motor correctly, because the oil will be too thick and sluggish to pass between the close-fitting bearings, and if used in a motor which is lubricated by splashing the oil it will not be splashed properly through the cylinders, pistons and wrist pins in adequate quantity for lubrication until the motor has been run fifteen or twenty minutes, and the temperature of the motor has thinned the oil down so it will begin to operate



The Light Draft

Orchardists everywhere are telling us that the Light Draft is the most effective of all orchard harrows. The Light Draft is an application of the springtooth in a new way.

WEIGHT CARRIED ON WHEELS.

Two broad-tired wheels are used on the Light Draft Harrow and the weight is so distributed as to be carried almost entirely on these wheels. This enables us to give you a harrow of good width without requiring greater horsepower.

STEEL FRAME.

The Light Draft comes very nearly being all steel construction throughout. The frame is steel and very liberally braced. The gangs are operated independently and easily.

FINE FOR ORCHARD WORK.

On account of its extension feature, which enables the ground to be worked right up to the trunk while the driver and team are in the clear, the Light Draft will do better work in the orchard.

HIGH GRADE SPRING TEETH.

Made of best grade spring steel and extra long. Note the manner in which they are arranged to permit working in trash.

YOU NEED THE LIGHT DRAFT.

It will cut your cultivation by enabling you to get over more ground in less time and with fewer horses. Ask for our free booklet, "Modern Orchard Tillage."

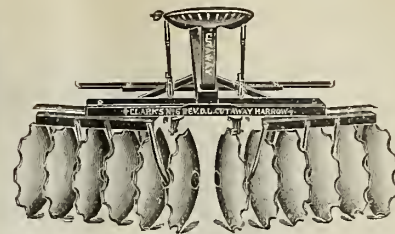
TWO HARROWS for Orchard Work

MYERS POWER SPRAYERS,
MYERS SPRAY PUMPS,
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In fact, everything for the cultivation and spraying of fruit trees. Let us have your inquiries.

Mitchell
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Portland, Oregon
Spokane, Wash.



The Cutaway

In the line of disc harrows there is nothing equal to the slotted disc Cutaway.

ACTS LIKE A SPADE.

The Cutaway slotted disc gives you the effect of a spade. It does not run through the soil as does the smooth disc, but digs it up and moves it in such a manner that none is left unpulverized.

FORGED DISC.

The discs on the Cutaway are forged and they stay sharp a longer time than the ordinary disc. The Cutaway has real dustproof bearings. The Cutaway bearings are exceptionally wide and there are plenty of them.

GENERAL CONSTRUCTION GOOD.

The Cutaway is strongly built throughout and designed to give years of hard service. We carry the Cutaway in many styles, including the Double Action Cutaway Harrows, the original and best of all double gang harrows. Send for our book, "Intensive Cultivation."

satisfactorily, which means excessive wear. On account of this difficulty Eastern refiners and motor-car manufacturers recommend a light oil for winter and a medium oil for summer because light Eastern oils have a better cold test than the heavy-bodied Eastern oils. Motor oils properly manufactured from California asphalt base crude have a natural zero cold test, making them much more satisfactory for use during the season when low temperatures prevail.

The Apple Crop Compared With Other Products of the Soil.—There are only seven crops, apples being the eighth, which exceed in valuation the apple crop. We give them in their order, as follows: Corn, wheat, oats, barley, potatoes, hay and cotton. The strange fact in connection with the valuation and prices of all other products of the soil in 1916, compared with 1915, is that rice is the only product of

the soil which sold at a lower price than last year with the exception of box apples.

Buying Early.—Prices on nearly all articles have been constantly advancing ever since the war began, and very rapidly during the last few months. There is no immediate prospect of the war stopping suddenly, and even if it does there seems to be a good reason to assume that it would be some time before the existing shortage could be made up, which must take place before prices will be very much lower. The car shortage is another serious problem at the present time, and in view of the probability that prices will not be less and the possibility it may be difficult to get supplies, it seems wise to suggest to the fruitgrower that they purchase promptly this season's requirements in the way of orchard tools, sprayers and other materials which they must necessarily use throughout the season.

other marketing concerns to reach out for the small cities, towns and villages, and if successful in so doing the extra volume of business obtained from these small cities would be so much withdrawn from the big cities, relieving the pressure and enabling the Northwest marketing concerns to secure better prices. It is a universally recognized fact when markets are glutted prices are low. The editor of "Better Fruit" has favored this plan for many years, advocating it universally. A list of towns was published by the Fruit Growers' Agency, giving the towns to which members had shipped during the season of 1916, showing 460 towns on the list for the month of November, an increase of about sixty towns over the month of October. The large number of towns reached by the Northwestern Fruit Exchange indicates that the crop has been spread out more extensively than ever before. For the first time in several years the big cities have not been congested or glutted with apples. Much better prices have prevailed in 1916, although the crop is the largest in the history of the business, than were obtained in 1912 and 1914, the previous big-crop years. Through Mr. W. F. Gwin, vice-president and manager, the Northwestern Fruit Exchange has given some publications a list of towns shipped to, which "Better Fruit" is pleased to publish in this edition. This list gives the number of cities and towns sold in the United States and foreign, by the Northwestern Fruit Exchange during the years 1910 to 1916,

Increasing the Market by Wider Distribution

ADVANCED thinkers and progressive marketing people for some time have realized the folly of the old method of selling the bulk of the apple crop of the Northwest in a few large cities, and have been favoring more extensive marketing, believing that if a sufficiently large number of small cities, towns and villages were sold that the consumption of Northwestern

apples could be increased,—with pressure relieved in the big centers much better prices could be obtained. A pioneer in this line of work has been the Northwestern Fruit Exchange. Some shippers have hesitated about giving a list of the towns which they sold, fearing it would invite competition. The progressive marketers have felt that by so doing it would stimulate

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Arsenate of Lead
Patented June 30, 1913

The "Standard" for Convenience, Economy, Efficiency

One Pound of "Corona Dry" Does the Work of Three Pounds of Paste Arsenate and Does It Better

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No evaporation—no leaks—no loss of strength. But an *absolutely standard spray mixture*, the uniform strength of which you can depend upon—and know that you have the *highest per cent of killing power.*

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Trade Mark

Special Notice

A STANDARD product of distinct and unquestioned superiority is always imitated with inferior grades by rival manufacturers. The indications are that this practice will be quite general in the production of Dry Powdered Arsenate of Lead. The use of new, inferior and untried brands is fraught with danger and dissatisfaction.

"Corona Dry" is the only brand that large and practical usage in every section of the country has proved unequalled as a spraying material. We know our good customers will continue to use only "Corona Dry" and we urge you to do the same. Accept no imitations or substitutes, but insist on "Corona."

Corona Chemical Co.

Sole Makers

"Corona Dry"

inclusive, up to December 28. The editor has no hesitancy in saying this is good constructive work. It is building for the future. In addition to this, the editor believes there are still hundreds of cities in the United States that can be sold that will use Northwestern box apples, and furthermore believes that when a sufficient number of cities are sold and the crop spread out thin enough over the United States there will be no trouble in marketing Northwestern box apples at satisfactory and profitable prices to growers.—Editor.

List of Markets Used by Northwestern Fruit Exchange

Seasons 1910, 1911, 1912, 1913, 1914, 1915 and 1916 (to December 28).

UNITED STATES

Alabama—Birmingham, Montgomery, Mobile, Selma.
Arkansas—Jonesboro, Little Rock, Texarkana, Ft. Smith.
Arizona—Bisbee, Douglas, Globe, Phoenix.
California—Bakersfield, Fresno, Los Angeles, Oakland, Pasadena, Richmond, Sacramento, San Diego, San Francisco, Santa Anna, Stockton.
Colorado—Boulder, Colorado Springs, Denver, Haxtun, La Mar, Pueblo, Sterling, Trinidad.
Connecticut—Bridgeport, Hartford, New London, Stamford, Waterbury.
District of Columbia—Washington.
Florida—Jacksonville, Tampa.
Georgia—Atlanta, Augusta, La Grande, Macon, Rome.
Illinois—Bloomington, Champaign, Chicago, Decatur, Freeport, Peoria, Rockford.
Idaho—Lewiston, Pocatello, Wallace.
Indiana—Evansville, Indianapolis, Muncie.
Iowa—Burlington, Cedar Rapids, Clinton, Council Bluffs, Davenport, De Moines, Dubuque, Fort Dodge, Keokuk, Marshalltown, Mason City, Oelwein, Ottumwa, Sioux City, Strawberry Point, Walcott, Waterloo.

Kansas—Anthony, Arkansas City, Bazine, Beloit, Bison, Brownell, Clay Center, Clifton, Coffeyville, Columbus, Concordia, Dodge City, Eldorado, Emporia, Fort Scott, Great Bend, Herington, Hoisington, Hoxie, Hutchinson, Independence, Jamestown, Kansas City, Kingsley, Lawrence, Luray, Manhattan, Marion, McPherson, Morganville, Morland, Neodesha, Ness City, Oakley, Olpe, Osborne, Ottawa, Parsons, Phillipsburg, Pittsburg, Protection, Salina, Scott City, Sterling, Topeka, Wakefield and Wichita.

Kentucky—Lexington, Louisville.
Louisiana—Alexandria, De Ridder, Lake Charles, New Orleans, Shreveport.
Maine—Bangor, Ft. Fairfield, Portland, Rockland.

Massachusetts—Boston, Fitchburg, Lawrence, Lowell, Springfield, Worcester.
Maryland—Baltimore.

Michigan—Detroit.

Minnesota—Albert Lea, Alexandria, Brainerd, Breckenridge, Crookston, Dilworth, Fergus Falls, Duluth, Glenwood, Graceville, Henning, Mankato, Minneapolis, Moorhead, North Redwood, Redwood Falls, St. Cloud, St. Paul, Thief River Falls, Wadena, Wilmar, Winona.

Mississippi—Hattiesburg, Jackson, Meridian.
Missouri—Carthage, Joplin, Kansas City, St. Joseph, St. Louis.

Montana—Bainville, Baker, Big Sandy, Billings, Boyer, Bozeman, Bryan, Buffalo, Butte, Cascade, Conrad, Culbertson, Cutbank, Fairview, Gilford, Glasgow, Glendive, Great Falls, Havre, Helena, Hinsdale, Homestead, Lewistown, Livingston, Medicine Lake, Miles City, Missoula, Plentywood, Poplar, Roundup, Scooby, Sidney, Westby, Whitetail, Winifred, Wolf Point.

Nebraska—Crawford, Crete, Fremont, Grand Island, Hastings, Holdrege, Hyannis, Kimball, Lewiston, Lincoln, McCook, Mitchell, Omaha.

New Hampshire—Manchester.
New York—Albany, Buffalo, Elmira, Ithaca, New York City, Syracuse, Wilson.

North Dakota—Alexander, Antler, Anamoose, Arnegard, Arthur, Beach, Berthold, Bismark, Bowbells, Carrington, Charbonneau, Crosby, Devil's Lake, Dickinson, Drake, Fargo, Finley, Grafton, Grand Forks, Hamlet, Hampden, Jamestown, Keene, Leeds, Lignite, Lisbon, Medina, Minot, Noonan, Plaza, Portal, Powers Lake, Rock Lake, Rugby, Stanley, Tioga, Towner, Valley City, White Earth, Wildrose, Williston, Wolfard, New Rockford.

Ohio—Akron, Bellefontaine, Cleveland, Cincinnati, Columbus, Dayton, Marietta, Newark, Toledo, Youngstown.

Oklahoma—Alva, Ardmore, Chickasha, Clinton, Duncan, Durant, El Reno, Enid, Guthrie, Hobart, Hugo, Lawton, McAlister, Miami, Muskogee, Okma, Oklahoma City, Purcell, Sapulpa, Shawnee, Tulsa, Woodward.

Oregon—Astoria, East Portland, Portland.

Pennsylvania—Altoona, Philadelphia, Pittsburg, Scranton, Wilkesbarre.

Rhode Island—Providence.
South Dakota—Aberdeen, Browning, Deadwood, Gettysburg, Huron, Kodoka, Mitchell, Rapid City, Redfield, Sioux Falls, Watertown.

Texas—Abilene, Amarillo, Austin, Ballinger, Beaumont, Big Springs, Bonham, Brownsville, Bowie, Brownwood, Cameron, Cisco, Cleburne, Comanche, Corpus Christi, Corsicana, Crockett, Cuero, Houston, Lockdale, Lockhart, Marshall, Mexia, Nacogdoches, Navasota, Palestine, Paris, Plainview, Rockdale, San Antonio, San Augustine, Sherman, Stanford, Sulphur Springs, Sweetwater, Dalhart, Dallas, Dennison, El Paso, Fort Worth, Gainesville, Galveston, Greenville, Hillsboro, Taylor, Temple, Tyler, Victoria, Waco, Waurika, Waxahachie, Wichita Falls.

Tennessee—Chattanooga, Knoxville, Memphis, Nashville.

Utah—Brigham City, Salt Lake City.

Virginia—Norfolk, Portsmouth, Richmond.
Washington—Bellingham, Chehalis, Everett, Puyallup, Seattle, Spokane, Sumner, Tacoma.

Wisconsin—Baron, Boscobel, Eau Claire, La Crosse, Milwaukee, Osceola, Oshkosh, Rice Lake, Rhinelander.

West Virginia—Charlestown, Clarksburg, Hinton, Wheelcr.

Wyoming—Basin, Casper, Cheyenne, Cody, Douglas, Gurnsey, Laramie, Rawlins, Sheridan, Thermopolis.

FOREIGN

Canada—Alberta, Brandon, Brantford, Calgary, Edmonton, Lethbridge, Medicine Hat, Montreal, Moose Jaw, New Westminster, North Battleford, North Bay, Ottawa, Prince Albert, Prince Rupert, Regina, Saskatoon, St. John, Swift Current, Toronto, Vancouver, Victoria, Weyburn, Winnipeg, Yorkton.

China—Hong Kong.

Cuba—Havana.

Denmark—Copenhagen.

England—Bedford, Birmingham, Brentford, Brighton, Croydon, Eastbourne, Hastings, Hull,

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tern asphalt-base crude can be made not only equal but superior to paraffine-base oils.

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Germany—Berlin, Bremen, Hamburg.
Holland—Rotterdam.
Ireland—Belfast, Dublin.
Philippine Islands—Manila.
Russia—Vladivostok.
Scotland—Glasgow.
Sweden—Gottenborg, Stockholm.
Wales—Cardiff.
Australia—Auckland, Melbourne, Sydney.
South America—Buenos Aires, Montevideo.
South Africa—Bulawayo, Cape Town, Durban, Johannesburg, Port Elizabeth.
Foreign markets, 70.

SUMMARY

United States 414
Canada 25
Australia 3
China 1

Cuba 1
Denmark 1
England 20
Germany (for redistribution) 3
Holland 1
Ireland 2
Philippine Islands 1
Russia 1
Scotland 1
South Africa 5
South America 2
Sweden 2
Wales 1
Total 484

Farm Life More Attractive

Some of the high-class magazines that investigated the national problems are calling attention to the fact that

there is a decrease in the movement of boys and girls on the farm to city life. It is a pleasure to note that such a change is taking place. Among some of the reasons for this change are mentioned the improved conditions in country life now as compared with country life a few years ago. Many fruit and farming districts are supplied with interurban car lines, which enable the boys and girls to go to the local towns frequently, taking in the social events that occur in these small cities, which they were unable to do in the past. Good roads and, by the way, automobiles that are being rapidly bought by



Orchard Brand products are manufactured with a thorough knowledge of the diseases and of the chemical and physical properties of the materials necessary to produce the required effects. This is the result of scientific study, laboratory and field investigations covering many years. They are the most efficient and consequently the most eco-

nomical products it is possible to obtain.

The use of **Orchard Brand** products gives the fruit grower the advantage of quick deliveries, fresh materials, minimum freight rates, prompt service, uniform prices, and definite and correct directions for their application.

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..... " apricots " grapes
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Balfour, Guthrie & Co., Portland, Ore.

Rogue River Co-Operative Fruit Growers' Association, Medford, Ore.

C. J. Sinsal, Boise, Idaho

Morgan, McKaig & Co., North Yakima, Wash.

Wells & Wade, Wenatchee, Wash.

Samuel Loney & Co., Walla Walla, Wash.

McGowan Brothers Hardware Co., Spokane, Wash.

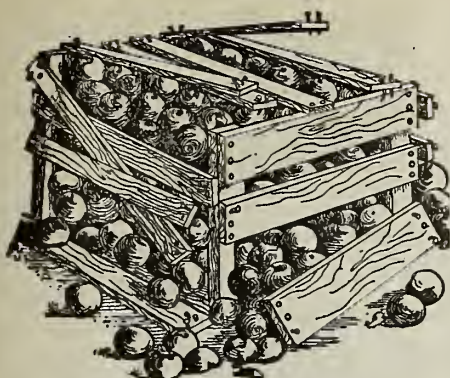
fruitgrowers and farmers are other factors. It is prophesied by many that in the near future practically every fruitgrower and farmer will own an automobile, as a combined business and pleasure proposition. Telephones add much to country life, doing away with much lonesomeness. Drudgery is removed by electricity—electricity doing away with the old-style lamps and the work of cleaning them. In addition to this there are individual plants which farmers can buy at a very reasonable figure, for lighting the house, where the district is not supplied with electricity. Of these an immense number are sold.

In addition to this electricity on the farm is a factor of great importance in the way of power. Many farmers and fruitgrowers nowadays have washing machines, sewing machines, feed cutters, wood-saw outfits and fruit-grading machines, all of which are run by electric power.

The apple crop of the Northwest for 1916 was about double any previous year in the history of the business. Crops overran estimates of even the most conservative estimators. Some growers had double their estimates. An apple crop is a hard crop to guess.

Good estimates can only be made through careful work. Every fruitgrower should endeavor to train himself along this line.

The Northwest apple crop is a bumper crop this year. In fact growers never had such crop before. They had all kinds of difficulties—shortage of paper, boxes; shortage of help and various other troubles. As Mr. J. R. Nunamacher expressed it, "The fruitgrowers of the Northwest never had a large crop before, and therefore did not know how to handle the 1916 crop." In future years they will know better.



BEFORE using Cement Coated Nails

Western Cement Coated Nails for Western Growers

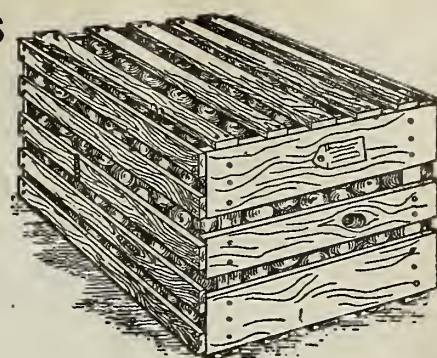
Our Cement Coated Nails are always of uniform length, gauge, head and count. Especially adapted to the manufacture of fruit boxes and crates. In brief, they are the Best on the Market.

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Cement Coated Nails

Accident Prevention Means Lower Insurance

By Carle Abrams, Member of the State Industrial Accident Commission

SINCE the State Industrial Accident Commission announced last July that a rate of 2 per cent had been made for general farming, and that application from farmers for the portection of the Compensation Act would be accepted, several hundred farmers have taken advantage of the Act and more farmers are coming in each day. The Commission has now declared an exemption of payments for February, and those who have paid into the fund for the preceding six months will have their insurance carried free during February. A similar exemption was made last July. This makes two exemptions for this fiscal year, which begins July 1, and is a reduction in the rate of 16½ per cent.

Those farmers as well as all other employers working under the Act, who have a good accident experience for the year, requiring the Commission to pay out for accidents to their workmen, not to exceed 50 per cent of that employers contribution, will be granted a reduction in their rate of 10 per cent. This will bring the farmers' rate down to \$1.80 on each \$100 of payroll. For those whose accident experience is as good for the second year, will receive a second reduction of 10 per cent in their rate on July 1, 1917, bringing the rate down to \$1.60 on each \$100 of payroll. These reductions are in addition to exemptions. The rate for those farmers paying 2 per cent this year is, therefore, after deducting two months' exemptions (one-sixth of the entire year), \$1.667 for each \$100 of payroll. After July 1, 1916, those that earn 10 per cent reduction will pay only \$1.50, and one year later this should be reduced to \$1.35, a very low rate indeed, provided the same monthly exemptions are then possible.

The state contributes sufficient money to the fund to pay all expenses of administering the fund, therefore every dollar paid by employers and workmen is available to be paid back to injured workmen for hospital and medical attention and for time lost. The rate the employers pay bears a direct ratio to the number of accidents. There are no leaks, no profits and no commissions

to pay. Accidents only are paid for. Reduce the number of accidents and the rate of payment to the fund will be reduced by additional exemptions.

The records of this Commission show that last year one of each eight workmen employed in hazardous occupations in Oregon were injured. This is too high a percentage. By co-operation of employers and workmen to prevent accidents the Commission believes that the number of injuries can be cut in half. That means cutting the rate in half, by reductions and exemptions, and the farmer would then be paying less than 1 per cent. No farmer in Oregon can afford to carry the risk of injuring or killing workmen when he can thus receive insurance with the absolute protection of the state at actual cost, and be given also the opportunity of constantly reducing his rate.

In view of the above, the Commission has issued a call to employers and workmen of Oregon to co-operate in a movement to prevent accidents, and will conduct an active campaign of accident prevention. The results desired can only be accomplished by co-operation of both employers and workmen with the state and will result in a vast

saving in money, and an increase in efficiency of manufacturing and other operations through preventing loss of time and the necessity of replacing injured workmen who are experienced with inexperienced men. What is more important still, it will prevent untold suffering to the thousands of workmen who are now annually torn and mangled, many of them made wrecks for life, while toiling to earn their daily bread.

Estimates on Crops Are Important

If every fruitgrower had made a reasonably correct estimate of his crop this year he would not have found himself short of help, paper, boxes, etc. A man must have the proper idea of the volume of business to be done in order to provide proper facilities for taking care of his business.

"Poultry Breeding and Management" is the title of a new book edited by Professor Dryden of the Oregon Agricultural College, Corvallis, whose fame as a successful, practical, scientific poultryman is well known, especially throughout the Northwest. Anyone who is interested in poultry will find this a very valuable book. Published by the Orange Judd Company of New York.



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has attained unusual popularity in the Northwest because of the satisfaction it has given the growers. It mixes easily, stays well in suspension, adheres to the foliage, will not burn and has exceptional covering properties. All in all, it is a perfect Arsenate of Lead.

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The Dow Chemical Company

MIDLAND, MICHIGAN

Keep Fowls Free from Lice, Mites and Disease

By Pren Moore, Poultry Husbandman, University of Idaho, College of Agriculture

LICE and mites are the greatest enemies of the poultry industry. Millions of dollars are sapped from the business by these little blood suckers. There is no time that a poultryman can feel certain that they are not robbing him. The extent to which they rob him depends upon the efforts he puts forth to keep them down.

Lice are on the fowls continually and they are usually found on the head, under the wings and around the vent. A splendid treatment for lice is blue

ointment. Apply about the amount of a kernel of wheat on the head (just back of the comb) under each wing and around the vent. The treatment should be applied three or four times each year. If blue ointment is used on little chicks, it should be used very sparingly. The amount required for one old hen is enough to treat a dozen little chicks. Chicks should always be treated on a bright, sunny morning; never at night or evening. All fowls should be treated during bright weather. If necessary to

treat old stock when the weather is damp, they should be kept in for two or three days. Never wait until the hens are lousy before treating them. the easiest and surest way to keep lice down is never to allow them to get a start. Treat every three or four months. One pound of blue ointment properly applied will treat five to six hundred hens. A pound of blue ointment should not cost more than \$1.25.

It is necessary to treat mites differently, as they stay on the fowls only while the fowls are on the perches, or on the hens while brooding. Paint the perches with some coal tar preparation, such as kresol, zenoleum, Lee's Lice Killer, or any other of the coal-tar preparations. We find the following solution to be the very best: 50 per cent tallow, 25 per cent kerosene, 25 per cent coal-tar preparation. The solution should be heated to the boiling point, thoroughly mixed and applied while hot. We use an ordinary paint brush and paint the perches, dropping boards and all around the roosting chamber, up as high as the fowls are likely to touch. If the mites are kept out of the place where the fowls roost, they can do no damage. The first warm days of spring is the time for the first application. If they are not allowed to get a start during summer, there will be none to bother during winter. Plenty of sunlight, clean houses and roosting quarters will do much in keeping down lice and mites. Whitewash, too, should be used freely. There should be no dark corners about the poultry house. Cleanliness and sunlight are hard on lice and mites. Many poultry diseases are the result of attacks of lice and mites.

An ounce of prevention is worth a pound of cure. This is an old adage and a true one. Particularly is it true when referring to poultry ailments. The best treatment for sick fowls is the axe. It is seldom profitable to attempt treatment of sick fowls. Their commercial value is not great enough to justify treatment. Their usefulness as producers or breeders is usually destroyed by the ailment. Provide conditions that will prevent the possibility of diseases. Sanitation is the secret. Sanitation means clean soil, proper housing and proper feeding. Clean soil is to keep fowls on fresh land where possible. Allow them a large free range. If it is not possible to keep fowls on fresh land or large range the yards should be cultivated and crops grown, such as oats, corn and sunflowers. Proper housing is to so construct houses that they afford plenty of sunshine and ventilation and yet protect the fowls from drafts. Proper feeding means an assortment of clean, well-prepared food. It also means plenty of fresh, pure water in clean drinking fountains. Running water is all the better.

Disinfect to kill lice and mites. Disinfection also kills disease germs. Do not allow sick or dead fowls to lie about the farm or yards. Fowls are natural scavengers. Decomposed foods of any kind are serious. Plum poisoning (known as limber neck in fowls) is usually the result of decomposed foods.

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BEST & CHEAPEST
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NORTHWESTERN
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A treatment for ptomain poisoning is one tablespoonful of castor oil and one-fifth-grain doses of sulphate of strychnine, the latter to be given every four to six hours until the fowl is relieved.

There will be few sick fowls when conditions are correct. Scaly leg can be successfully treated with lard and kerosene. The formula is a tablespoonful of kerosene to a half teacup of lard. Two or three applications will usually clean the legs. Aspergillosis is a disease caused by feeding mouldy grains or feeding in mouldy straw used as litter. The only remedy is to remove the cause. There is no treatment for the disease. Bumble foot is a swelling of the feet which develops bunions on the bottom of the feet. The cause is jumping from high perches.

There is always danger of contagious diseases, such as roup, cholera, chicken-pox and catarrh. The danger is greatly reduced when fowls are in proper physical condition. Thrifty fowls are almost immune from diseases. Diseases are in all cases more easily prevented than cured.

Closer Commercial Relation

An exchange of professors between the School of Commerce of the University of Oregon and some one of the universities of South America is the plan of H. B. Miller, director of the department of commercial and industrial survey. The plan is intended to bring about a closer commercial relation between Oregon and South American countries through the medium of education. It will be presented to the university regents by Professor P. L. Campbell. "Ignorance always means prejudice and lost opportunities. Knowledge is the beginning of trade as well as of friendship," is the way President Campbell puts it, realizing that one of the duties of the School of Commerce is to further the prosperity of the state in every way that is within the province of an educational institution of this kind.

The intention is that the man who will come here from South America shall be conversant with the commercial trade and possibilities of trade and the natural resources and manufactured products of his part of the world, with special reference to the demands of the Pacific Northwest, and particularly of Oregon, and that he shall instruct the students of the School of Commerce along lines of commercial development of the relations between Oregon and South America. In addition, he will teach business Spanish, the more or less technical phraseology of trade and trading. Conversely, the man who will go from the School of Commerce of the University of Oregon will have made a detailed study of all those products of Oregon for which a South American trade can be developed. This knowledge he will transmit to the university to which he is credited, as well as teach commercial English there.

The School of Commerce believes this exchange of instructors to be one of the most practical and efficient methods of developing commercial relations with

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Have Gotten Results for 15 Years



Ideal Dusting Outfit.
60 Acres a Day.

**The Method is Right
K. C. Dusters are Right
The Prices are Right**

Send for 1917 Catalog and full information to the

Dust Sprayer Mfg. Co.

1417 St. Louis Ave.

Kansas City, Mo.

other countries. The man sent from the School of Commerce to South America first will go on a trip throughout the state to make a detailed study of the lumber, paper, box-making and furniture factories, fruit canneries and dryers, flour mills, meat packing plants and other of the leading industries, that he may be prepared to call the attention of the importers and business men of the South American states to Oregon trade possibilities. He also will be instructed to study the products of the South American state to which he goes, especially those that may be imported



If He'd Kept Bees

the man who said business and pleasure never mix would have known better. Or perhaps he lived too long ago. It's the honey-bee, plus modern methods and the increasing demand for honey that accounts for present-day

Big Profits in Bee-keeping

Wherever you are, you can start right in with bees—for business, or pleasure, or both. There's keen enjoyment to be had out in the sunshine, studying their wonderful colony organization. They earn from \$2 to \$10 per colony, according to locality and care; and one experienced apiarist can handle 500 colonies. Write to us for particulars, and get our

Special Offer Or, if you're a going bee-keeper, we want to tell to **Beginners** you about our double-walled Buckeye hive in which the bees winter so well, and our gentler, harder strains of queen bees. For better prices, use the Root clear glass jars, honey-comb cartons, section honey boxes, shipping cases and labels.

Send for complete descriptive catalog
THE A. I. ROOT CO. Medina, Ohio

Praises Orenco Trees

Mr. C. B. Hill, Oak Point, Washington, writes:—"I hear nothing but praise of the nursery stock you have shipped this fall."

Similar statements are received from scores of customers in different sections, which proves that planters recognize and appreciate the high standard of **ORENCO TREES** and the fresh, vigorous condition in which they are received.

ORENCO TREES are sold only by our own salesmen and shipped direct from our nursery, reaching you in a fresh, vigorous and healthy condition. **ORENCO TREES** are **NOT** handled through dealers. You may buy **scrubby** trees for less money, but you can't buy **BETTER** trees for more money.

Don't fail to get our prices on Superior Orenco Trees on any list, small or large, you may need.

Consultation and advice perfectly free and willingly given.

Orenco Nursery Company

Orenco, Oregon

A Salesman's Position Now Open
Write for Particulars

Paint Without Oil

Remarkable Discovery That Cuts Down the Cost of Paint Seventy-Five Per Cent.

A Free Trial Package is Mailed to Everyone Who Writes.

A. L. Rice, a prominent manufacturer of Adams, N. Y., has discovered a process of making a new kind of paint without the use of oil. He calls it Powderpaint. It comes in the form of a dry powder and all that is required is cold water to make a paint weather proof, fire proof, sanitary and durable for outside or inside painting. It is the cement principle applied to paint. It adheres to any surface, wood, stone or brick, spreads and looks like oil paint and costs about one-fourth as much.

Write to Mr. A. L. Rice, manufacturer, 78 North Street, Adams, N. Y., and he will send you a free trial package, also color card and full information showing you how you can save a good many dollars. Write today.

WHEN WRITING ADVERTISERS MENTION BETTER FRUIT

into the Northwest; and also to familiarize himself with the banking methods and houses and business concerns with which business is likely to be developed. In other words, he becomes the commercial agent of the School of Commerce to develop and improve Oregon commercial relations, as well as to give instruction in the English language.

The instructor in Spanish who will come here will be asked to meet the various representatives of trade in Oregon through the Chamber of Commerce of Portland, and will become an adviser to the Bureau of Trade and Commerce of that Chamber in matters pertaining to trade in the territory from which he comes.

After the return of the representative from Oregon he will be asked to meet the business men of the state through the Portland Chamber of Commerce, to give them the benefit of his investigations.

The Transportation of Trees

The transplanting of trees is always accompanied by some danger of loss or backset because of loss of feeding roots, drying of the bark of the roots, thus making activity impossible; or failure on the part of the planter to make the soil firm around the roots and thereby prevent wind injury to newly-formed rootlets.

Immediately upon receipt of trees, if they are moist and in good condition, heel-in in moist soil. If the roots are dry and the top shriveled, bury top, roots and all in moist soil for a few days before planting. This will frequently save trees when ordinary treatment would not.

When ready to plant dig the holes large enough to accommodate the roots without cramping and deep enough so that when the tree is transplanted it will stand from one to two inches deeper than in the nursery. Prune off all injured or bruised parts of the roots so that the cut ends will rest on the bottom of the hole or will face downward. Place the tree in the hole so that it rests firmly on the bottom; fill in with moist, rich soil until the hole is from one-third to one-half full, or until the roots are thoroughly covered, shake the tree slightly to work the soil among the roots, and then get into the hole and tramp the soil until it is "firm." If it is impossible to "firm" it with the feet, use a piece of 2x4 six to eight feet long, the end of which should be padded. Fill the hole and leave the surface loose and smooth, but never cloddy or covered with chunks of sod.

If water is to be used it is best to dig the holes one or two days before planting and put from two gallons or more of water in each hole, permitting it to soak away before planting. Never apply water to the surface of the ground around trees after they are transplanted, as it will do more harm than good.

The roots of deciduous trees may become very dry and yet not suffer serious injury, but evergreens must never be permitted to dry, as they have a resinous sap which hardens when it



IT TAKES 400,000 cars to carry American Fertilizers to Farmers and Planters every season. Forty per cent. of this is useless Filler requiring 160,000 cars! Insist on having less Filler and all high grades with Available Nitrogen, namely:

Nitrate of Soda

and thus cut freight bills.

Crop production from such Fertilizers means greater outbound tonnage for roads and bigger purchasing power for Farmers. Railroads and everybody would benefit.

Larger food crops thus grown would give increased prosperity to all. It is up to you, Mr. Farmer.

Send for "Cost of Available Nitrogen"

DR. WM. S. MYERS

Director, Chilean Nitrate Propaganda
25 Madison Avenue New York
NO BRANCH OFFICES

BUY AND TRY

White River Flour

MAKES
Whiter, Lighter
Bread

SPRAY

The simplest spray pump made. No suction. No packing to wear out. Pressure of 115 pounds can be reached. Use in bucket, keg or barrel.

Will Spray Any Liquid

Any disinfecting fluid, whitewash, water color paint or crude oil can be used in this pump. No sediment can get in. Your mixture can not settle—the pump keeps it agitated. Nothing to break or wear out. Strong materials. Weight 18 pounds. Write today for full description. Dealers wanted where not represented.

Peoria Hydraulic Pump Co.
Peoria, Illinois

WHEN WRITING ADVERTISERS MENTION BETTER FRUIT

dries out or comes in contact with the air. This kills the trees.

Evergreen trees can be transplanted almost any month of the year, but best results are obtained by transplanting just as the buds begin to expand, usually form the tenth of April to the first of May, or right after the spring growth has hardened, from the middle to the last of July. Deciduous trees must be transplanted during the fall or very early in the spring. Late spring planting in Eastern Washington is not satisfactory on account of the long, dry summer.—W. S. Thornber, Director of Extension Department, State College of Washington.

"Semi-Centennial History of the Patrons of Husbandry," by Thomas Clark Atkeson, Master of the West Virginia State Grange and Past Overseer of the National Grange, published by the Orange Judd Company, is a very interesting book, dealing with the history and development of the Grange movement. Illustrated with full-page illustrations of men who have been prominent in the development of Grange work, something every man connected with Granges and farmers will find instructive as well as interesting.

"Skookum" Apples

Three years ago the Northwestern Fruit Exchange introduced the "Skookum" brand to Eastern purchasers and consumers of Northwestern apples. The name made a hit on account of its oddity. Nobody knew what the word meant, consequently it commanded immediate attention. People began to wonder. Later an educational advertising campaign followed, giving a definition of the word and origin. The word "Skookum" is an Indian word and stands for good, best, and signifies goodness to the fullest extent. The Indian language has very few words and very few adjectives, consequently the word "Skookum" was the one word for the best quality without any superfluous adjectives. The Northwestern Fruit Exchange hit upon a very popular idea in the adoption of the word "Skookum." The first year the Northwestern Fruit Exchange spent a little money. The campaign was successful. The second year, while the exact figures are not known by the writer, probably somewhere from \$15,000 to \$20,000 was spent. The 1915 campaign was a decided success, so that in 1916 a big national campaign was adopted, and it was reported that in 1916 in the neighborhood of \$75,000, possibly more, was used in advertising this brand. Advertisements have appeared in a large number of the national magazines like the Saturday Evening Post, the Literary Digest, the American, Good Housekeeping, and others. This has been supplemented with street car advertising, consequently nearly everyone throughout the East and Middle West has become familiar with "Skookum" apples, grown in the Northwest. The campaign has been a big factor in creating an additional demand and a

greater consumption for Northwestern apples.

The word "Skookum" has been very catchy. This is evidenced by the fact that a number of dealers have appropriated the idea originated by the Northwestern Fruit Exchange. One New York department store advertised "Skookum" socks, "Skookum" shirt waists, and "Skookum" boys' clothing. A number of doll manufacturers in the United States, including the makers of the Campbell Kids, the Fliek Kids and

Sis Hopkins, have been competing for the privilege of putting out a "Skookum" doll in 1917. The doll manufacturers have agreed to make an exact reproduction of the "Skookum" Indian girl in the doll, which will be put on the market next year for the youngsters for Christmas. The doll will be sold through jobbers and traveling men all over the United States.

Another hit has been scored in advertising the "Skookum" brand of apples with the Hotel Belleclaire of

FRUIT-FOG

**Adds Thousands of Dollars
To Fruit Profits!**

The Scientifically
atomized
SUPER-SPRAY
produced by
Hayes Sprayers

Gets Hidden Pests!

Saves Time—Saves Solution

Fruit-Fog envelopes everything with a fog of solution—works in and around, up and down. Seeps into most minute crevices. No hidden pest or disease can escape it.

HAYES HAND AND POWER SPRAYERS

Fruit-Fog deposits a thin film of solution—which instantly adheres. No danger to foliage! No drops form to run away, as with low-pressure sprays! Only a small amount of solution necessary. Big loss saved. Nozzle capacity greatly increased. This means utmost speed with thoroughness. Perfect control and clean sound fruit is the result.

Find out about **Fruit-Fog** at once. Mail the coupon below.

Guaranteed Hayes Power Sprayers are tested to 500 lbs. pressure and **GUARANTEED** to maintain 300 lbs. working pressure at full rated capacities. We make 50 styles of large and small Hand and Power Sprayers for orchards, field crops, shade trees, hops, poultry, painting, farm, home and garden use.

Spraying Guide FREE Also interesting book on Fruit-Fog and our big 64-page catalog. All free if you check and mail coupon.

HAYES PUMP & PLANTER CO.
Dept. K, Galva, Illinois



COUPON

Hayes Pump & Planter Co.
Dept. K, Galva, Illinois

Please send Spraying Guide, book on **Fruit-Fog** and 64-page catalog. I am interested in

☐ Hand Sprayers ☐ Power Sprayers ☐ Nozzles and Fittings

Name.....

Address.....



Write Today for These Free Apple Booklets

Every Apple Grower should have them. Makes no difference whether you have a big orchard or only two or three trees. Tells you how to keep your trees free from Aphis, Red Bug and other insects that are proving more dangerous to orchards than scale or blight. You must kill and control Aphis with

Black Leaf 40—Kills by Contact

Equally effective when used separately or with other sprays as directed. Endorsed and recommended by Experiment Stations and Agricultural Colleges, and **guaranteed** by the manufacturers. Don't delay. Get these books at once. This is the time to control Aphis. One killed now equals thousands later on. We will also send you a valuable Spraying Chart telling just when to spray.

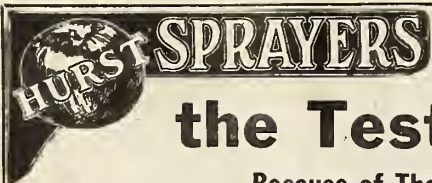
You who are interested in Vegetables, Flowers, or Fruit other than Apples should write us for literature on these subjects.

The Kentucky Tobacco Product Co.
Incorporated Louisville, Kentucky

Black Leaf 40

Kills Aphis

40% Nicotine



Have Stood the Test for 30 Years

Because of Their Simplicity and Durability

And these are the first things you should insist upon in the sprayer you use. Demand more than a guarantee. Pick the sprayer so constructed that it will be ready to use when you want it without first making repairs.

Thirty years of successful manufacturing experience has taught us how to eliminate the weaknesses of the ordinary sprayer. The Hurst has the fewest parts; is the most easily accessible; is free from bunglesome mechanism; is built for real hard service; and because of all of these things, it lasts the longest and gives you the best value. We have 40 different styles.

Write today to our Western Branch and ask for special prices.

The H. L. Hurst Mfg. Co.

264 Front Street

PORTLAND, OREGON

D. J. FOOTE, Western Manager

Factory: Canton, Ohio



Acme Power Sprayer

900% INCREASE IN APPLE PRODUCTION

was obtained through careful experiments conducted on selected plots in the Hood River Valley by the application of

Nitrate of Soda

"The Best, Cheapest and Most Available Source of Nitrogen."

The results were preceded by an improved character of blossoms, increased fruit set, wonderful tree vigor and great terminal growth.

Perhaps, under your own conditions, you could not get so large a percentage, but if you obtained 100%, 200% or 300% would it not make the use of Nitrate worth your while? Certainly, and you can do it.

Early March is the Time

when Nitrate of Soda will exert the most beneficial influence on tree growth and production. Don't miss your great opportunity.

Write us at once for further information and literature.

NITRATE AGENCIES CO.

Leary Building, SEATTLE

New York, located on 77th Street and Broadway. This hotel is making a specialty of serving apple pies to its guests, and in addition has a delivery service for supplying its famous apple pies to all families of the city. The "Skookum" apple pie is featured on the menu of this hotel, and in addition the "Skookum" brand of apple pie is featured in the advertising campaigns of this hotel.

Another success has been scored with the dining-car service of several Eastern roads, which are now using "Skookum" Northwestern apples. Among the

users of "Skookum" apples in their dining-car service may be mentioned the Western Pacific, The Delaware, Lackawanna & Western, Chicago, Milwaukee & St. Paul, and Denver & Rio Grande.

For a long time walnuts have been grown successfully in the Willamette Valley in a commercial way, where there are many good-sized walnut groves. In the early days a few walnut trees were planted in the more rigorous climates like Yakima and Hood River Valleys, and other sections east

of the mountains. Some of these walnut trees are now quite old and have been bearing good crops for a number of years. Those who have investigated find that in many sections east of the mountains, like the ones referred to, there are many walnut trees scattered here and there throughout the different districts. In these districts are found the Franquette and Mayette varieties, which are two of the best quality nuts among the English walnuts. While the editor is not prepared to say that walnuts grown east of the mountains would be a success in a commercial way he feels justified in suggesting that it would be well for every fruitgrower to plant a few walnut trees, at least for home use. If his crop should be more than he could consume at home, there is always a ready market for them in the cities at very satisfactory prices, as the varieties referred to usually sell at wholesale from 20 to 25 cents per pound.

New Machine for Testing

A machine for testing the strength of boxes has been devised by engineers of the Forest Service and is in use at the Forest Products Laboratory at Madison, Wisconsin. The machine is the result of experiments made to determine a fair test for all types of boxes. A series of tests in co-operation with the American Society for Testing Materials and the National Association of Box Manufacturers has been carried on during the past year to determine the strength of boxes of various woods and of different construction. Over four and a half billion feet of lumber is used for box making every year, and on this account the tests are considered important. Moreover, big losses are caused by the breakage of boxes in transit, and all parties concerned are said to be anxious to determine the best kind of box. The machine consists of a hexagonal drum with 3½-foot sides, which is lined with thin steel sheets. Pieces of scantling bolted to the bottom form what are known as "hazards".

In making the tests boxes filled with cans containing water are placed in the drum, which is then rotated. For convenience in observing the results of the tests, the sides and ends of the box are numbered with large figures, and in addition other numbers are placed at specified points on each side. The "hazards" cause the boxes to be carried part way around and then dropped back to the lower level of the drum. Each fall of this sort is a pretty fair imitation of the probable treatment it would receive in shipment. The boxes are watched carefully, and notes are taken on the manner in which they give way and the number of falls required to break them in pieces. In this way, say the officials who have conducted the tests, it is possible to determine what kinds of woods are best suited for boxes. The tests showed a decided need for a standard classification of box woods, and three groups have been made, based on the data which was obtained.

The tests also show the best methods of box construction. The experts say that one of the most striking things brought out was the inadequacy of the ordinary methods of nailing up boxes. The number of nails used and the way they are put in are important. One nail more to the side of a box will give it a great deal more strength than might be thought. The nails should not be driven too deep into the wood. In many cases, it is said, proper nailing will allow a reduction of the amount of lumber used without any decrease in the value of the box. Boxes with cleated ends were found to be much stronger than those without cleats. As a result of the tests made at the Forest Products Laboratory, tentative specifications for boxes used in shipment of canned goods have been drawn up and submitted to the various parties interested, for discussion.—Forest Service, United States Department of Agriculture.

Car Shortage

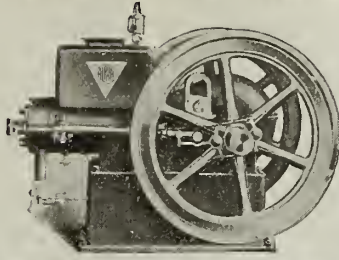
On account of the immense increase in business the United States has suffered from lack of adequate car service to move the crops of the farmers and fruitgrowers and all other industries. It takes time to build cars. Relief in this way, therefore, will be slow. Consequently railroads have urged all shippers to be prompt in loading cars and equally prompt in unloading. Most excellent advice, which should be followed by every shipper, because in doing so he will not only help himself but everybody else as well.

The editor of "Better Fruit" has very carefully estimated his crop each year by taking tree-to-tree estimate. In addition to this the editor has his orchard listed in eight blocks, according to age and varieties. A record is kept of the number of boxes harvested from each block of each variety each season. Then the editor makes a careful estimate of the percentage of the increase or decrease in each block, adding up the total, compares it with the total estimate, tree by tree, then takes the average of the two for the estimate for the coming season. This method has been very successful, in fact so successful that the editor's estimate only varied about 10 per cent during 1914-1915 from the actual crop harvested. In 1916 the actual number of boxes shipped was ten boxes over the estimate made. Every grower can do just as well as the editor of "Better Fruit" if he will take the pains and the trouble to train himself in this line of work.

"Judging Farm Animals," by Charles S. Plumb, Professor Animal Husbandry in the College of Agriculture of Ohio State University, is a very interesting and valuable publication, the illustrations showing how to judge quality in all kinds of farm animals like horses, cows, sheep, pigs, etc. The information is of great value to every fruit-grower or farmer. Published by Orange Judd Company of New York.

ECONOMICAL PUMPING

Can Only Be Accomplished by the Use of Efficient Pumping Equipment



Alpha, Self-Contained, Hopper Cooled Engine Make Efficient, Reliable Pumping Plants

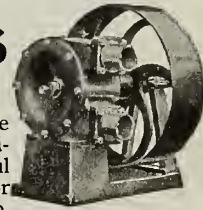
All Alpha Engines are equipped with a high-class, built-in, gear-driven magneto; they start on the magneto without cranking and the use of batteries and coils is entirely eliminated. Built in all sizes from 1½ to 100 H. P.

VIKING ROTARY PUMPS

An Ideal Irrigation Pump

Viking Pumps will deliver more water per minute for the same amount of power used than any other type. Its very high efficiency is due to its positive delivery, correct design and careful manufacture. It is SELF-PRIMING, requiring no foot valve or priming pump and is easy to install. Investigate the Viking Pump.

Built in capacities from 20 to 1,600 gallons per minute.



Viking Rotary Pump

Send for complete catalog of both Alpha Engines and Viking Rotary Pumps. They are yours for the asking. Now is the time to consider pumping equipment.

De Laval Dairy Supply Co.

Agencies in All Pacific Coast Territories 101 Drumm St., SAN FRANCISCO

for WINTER SPRAYING

Diamond Spra-Sulphur Solution

A dry compound that quickly dissolves—and stays in solution. Will not clog or cut nozzles. Superior form of sulphur for destroying San Jose and other scale insects, and all fungus diseases controllable in the dormant season.

100 lbs. Spra-Sulphur (dry) equals a 600-pound barrel of lime-sulphur solution—and no freight to pay on the water.

Scalecide

The Best Miscible Oil Spray for San Jose Scale and soft-bodied sucking insects. Contains a powerful fungicide. A dormant season spray.

for SUMMER SPRAYING

Corona Arsenate of Lead

Contains only Arsenic and lead oxides. No fillers. Easy and quick to mix. Stays mixed longer and sticks better to branches, leaves and fruit than any other arsenate. Always uniform strength. Cannot freeze. Highest percentage killing power. No sediment, no lumps, no waste.

Gould's Spray Pumps

We are general agents for the Gould Spray-pumps, guaranteed to be the best built, most lasting and of the highest efficiency. They are the recognized standard. Send for our special booklet, listing all kinds and giving full data.

Our 1917 Catalog

164 pages listing the best of everything for Home and Market Gardens, Orchards, Poultrymen and Bee Keepers—is a dependable reference and a safe guide to your purchases. Ask for Catalog No. 200

**PORTLAND SEED
COMPANY**

PORTLAND, OREGON





UNION PACIFIC SYSTEM

OREGON WASHINGTON LIMITED IS SHOWN PASSING HORSETAIL FALLS ONE OF THE MANY UNION PACIFIC TRACK-SIDE WONDERS OF COLUMBIA RIVER GORGE

OREGON-WASHINGTON LIMITED ON ITS WAY TO CHICAGO
VIA THE FAMOUS COLUMBIA RIVER ROUTE

UNION PACIFIC SYSTEM

PARALLELS THE COLUMBIA RIVER HIGHWAY TWO OTHER SLENDID THROUGH TRAINS EAST DAILY

Automatic Safety Signal Protection all the way
IT COSTS NO MORE TO TRAVEL RIGHT GO UNION PACIFIC SYSTEM

Wm. McMurray, General Passenger Agent, Portland

The De Laval Dairy & Separator Company announce that after January 1st, 1917, their Seattle branch office will consolidate with the San Francisco office, creating a larger and more efficient office and sales organization for the entire Pacific Coast. In order to care for the large business of Oregon, Washington and Idaho stocks will be carried at Seattle and Portland as in the past, of their separators, Alpha Engines, Acme Feed Cutters, etc. Mr. J. V. Shepard, extensively known throughout the Northwest, has been transferred from the Seattle office to San Francisco and will continue to act as sales manager for the Northwest territory.

"Modern Fruit Marketing," by Bliss S. Brown, Professor of Horticulture in the University of Maine, is quite a complete treatise on the harvesting and marketing of fruit crops, with several chapters on selling methods and fruit organizations. It covers all the modern phases of harvesting, with splendid illustrations of the different kinds of equipment that are necessary in harvesting the apple crop, either box or barrel. Published by the Orange Judd Company of New York.

The Montana State Horticultural meeting was held at Plains, Montana, January 23 to 25. Montana usually holds a splendid meeting with a lot of splendid addresses on important subjects to fruitgrowers in that state particularly.

Profits in Early Spring Tillage

Plowing and disking should begin as soon as the soil is in good tillage condition. By this practice two distinct benefits are realized in the semi-arid sections of the state, viz., moisture conservation and the establishment of a granular mulch. In the more humid sections early tillage increases the length of the nitrification period, it aerates the soil and conserves moisture. The results of this practice will insure additional crop yields over late tillage operations. The greatest loss of moisture occurs in the early spring, when the soil is saturated with moisture. Henry Holtz, of the Washington Experiment Station, Pullman, gives the results of an experiment showing the inches of water evaporated from soils containing different percentages of soil moisture.

Per cent of soil moisture	Inches of moisture evaporated in 24 days
1227
1840
24	2.16
30	4.25

The moisture in the soil at the time when tillage operations may begin is about 24 to 26 per cent. The above table shows an evaporation of about 3.5 inches in 24 days, or approximately one inch each week. Where moisture is the limiting factor, the conservation of one inch of rainfall is equal to about two and a half bushels of wheat per acre, or its equivalent in other crops. A soil that has a one or two-inch mulch

will lose only one-fourth to one-eighth as much water as a soil untilled.

Early plowing develops more available nitrogen and produces a larger crop than late plowing. An experimental field at Pullman contained four summer-fallowed plots, two plowed and tilled early (April 5) and two late (June 10). The plots tilled early developed 497 pounds of nitrates and yielded 47.7 bushels of wheat per acre. The plots tilled late developed 338 pounds of nitrates and yielded 34.6 bushels per acre, or a decrease of 13.1 bushels of wheat per acre. Considering the expense of operation, taxes, etc., \$12 per acre for the late spring tillage and \$14 for the early spring tillage, with the price of wheat at \$1 per bushel, there would be a net return of \$33.70 for the early and \$22.60 for the late tillage plots, or a difference of \$11.10 in favor of early tillage.—Bulletin of State Agricultural Experiment Station, Pullman, Washington.

The Massachusetts Fruit Growers' Association held their convention in Springfield, Massachusetts, January 9-12, inclusive. This is one of the most progressive fruitgrowers' associations in any of the Eastern States.

The Mt. Arbor Nursery, Shenandoah, Iowa, has recently incorporated with capital stock of \$300,000. Mr. E. S. Welch, who has been at the head of the institution since 1891, has been selected as president.

Cost of Operations and Returns

Continued from page 8

Manufacturing costs would approximate 2.7 cents per dry pound, or \$6.75 per ton of fruit used. Deducting these amounts from \$18.50, we would have in the first case—that of the general purpose dryer with a long working season—\$13.00, in the second case \$11.75. From these amounts the operator must obtain his profits—my estimates of manufacturing costs include a reasonable salary for his services as general superintendent of the plant—and pay the grower for the fruit used. If we allow the operator of the plant 10 per cent of the gross returns as his profit, and make a further deduction of \$1.85 from each of these amounts, we have remaining \$11.15 and \$9.90. These sums do not represent the amounts which growers may expect to receive from their fruit, for two reasons: in order that he evaporator may have assurance of such supplies of material as will keep the plant running at capacity throughout each season, he must usually contract with growers for his supplies for a term of years in advance, and must therefore protect himself against the possibility of a future more or less permanent decline in the price of his product; also, he must provide a sinking fund to meet the expense of carrying his product in storage over an occasional year of overproduction and consequent temporary disorganization of the market. After these contingencies are provided for, it will be seen that the grower may legitimately expect a price of \$9.00 to \$10.00 per ton for his cull fruit upon contracts extending over a term of years. A well-equipped plant might profitably pay an additional \$1.00 per ton for packing-house culls of uniform size, reasonably free from imperfections, since there would be made from these a product most of which would grade higher than prime and which could advantageously be packed in fancy cartons for the retail trade. In years of limited production in the Eastern evaporating districts, such as the present, the price paid to growers could advance proportionately as the price of prime dry stock rose above 6½ cents per pound on board cars at the point of origin, but \$10.00 per ton would seem to be an equitable valuation of the material, which will scarcely be materially altered by changes in market conditions for some years to come.

It seems to be generally agreed by the members of this conference that the annual production of culls in our bearing orchards is not far from 1½ tons per acre. This figure will of necessity be somewhat increased as the trees become older, but if we were able at present to fully utilize the unmarketable fruit through evaporation, the growers should realize approximately \$15.00 per acre from material which is at present wholly or practically wholly lost.

I wish to digress for a moment from the primary purpose of this article and to speak of the possibilities for evapo-

Turn Apple Waste to Profit

Many are Doing It Now.



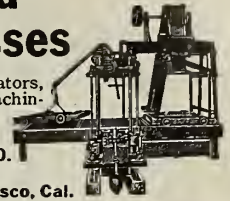
Sizes 10 to 400 barrels daily. We also make cider evaporators, apple butter cookers, vinegar generators, filters, etc. All machinery is fully guaranteed. All power presses have steel beams and sills. Write Today for Catalog.

Hydraulic Press Manufacturing Co., 60 Lincoln Ave., Mount Gilead, O.

Pacific Coast Representatives
Berger & Carter Co., 17th and Mississippi Sts., San Francisco, Cal.

START a paying business that grows almost without effort. Thousands are making **Big Money** turning apple waste into profits for themselves and their neighbors by making **Good Marketable Cider** from windfalls, culls, undergrades, etc., on

Mount Gilead Hydraulic Cider Presses



Once Over!

Two disks in one with a double-action harrow!

Cutaway (CLARK)

Save half the time and labor and have a better seedbed. Use a CUTAWAY (CLARK) Double Action Harrow. Its rigid main frame causes the rear disks to cut and turn all the land left by the fore disks—and with equal force. It will

Disk Harrows and Plows

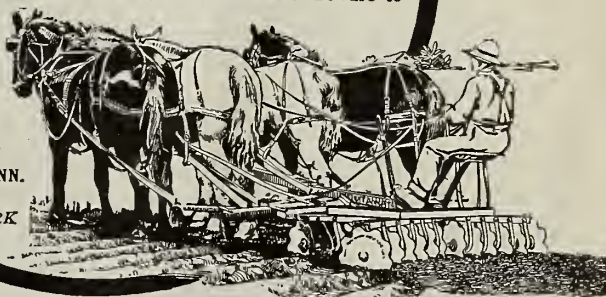
Quickly Cut, Pulverize and Level

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ration as a possible solution for the problem presented by our inferior varieties. It has been clearly and conclusively shown in papers presented at this conference, and especially by the review of the whole situation which Mr. Sickles has given us, that this problem is a very real and pressing one and that nothing could do more to insure the successful future of the Northwestern apple industry than the immediate and permanent removal from the fresh-fruit market of a large number of varieties. At present, those varieties which Mr. Sickles has classified as consistently unprofitable make up very considerable percentages of the bearing acreage in every one of our commercial apple-growing districts, and the injury resulting to the industry from the annual overcrowding of the markets of our own territory with these low-priced apples has been very clearly pointed out. But to my mind a still more serious problem confronts the industry in the form of a still larger portion of the apple acreage which is planted to varieties characterized as doubtful. We must frankly face the fact that a very considerable number of these doubtful varieties owe their place in the doubtfully profitable group to the fact that, when grown under our conditions, their quality is distinctly inferior to that attained in other districts better suited to their production. Certainly no one can question the fact that the best Ben Davis produced in our territory is decidedly inferior to the Ben Davis of the Ozarks, that the Northern Spy of Michigan is much superior to our own, or that we cannot produce, even in the districts west of the Cascades, a Rhode Island Greening or a Baldwin which will compare favorably with those grown in New York and the New England States. One might go on to enumerate a large number of varieties which are so far unsuited to our conditions that their product cannot rank with that of districts peculiarly adapted to their best development, but it is superfluous to do so since every grower can make such a list for himself. In order to learn what varieties would give best results under the conditions prevailing in our newly developed orchard districts, practically every apple grower in the North American apple-growing territory has been planted more or less freely. We are emerging from this period of wholesale experimentation with the knowledge that the great majority of these apples, however excellent they may be elsewhere, can never attain more than mediocre quality under our conditions. It was absolutely necessary that we acquire this information, which could be obtained in no other way, and we are profiting by it, since the trend in the more recent plantings has everywhere been strongly toward the better varieties. In the meantime it can do no good to convince the consuming public that we can grow inferior fruit, but unless each of the apple-growing districts of the Northwest suppresses its unsuccessful experiments and reduces the number of its commercial varieties to not more than twelve or fifteen,

this is precisely what we are in a fair way to do. For practically every doubtfully profitable or distinctly unprofitable apple we grow is such because it is better when grown somewhere else, because it lacks some one or more of the essential qualities which have made Northwestern apples famous, and when placed upon the market it injures the industry by doing its share to destroy confidence in the superiority of our fruit in the minds of the ultimate consumer.

Some of the ways in which the marketing of this fruit harms the industry have already been pointed out in this conference, and I need not dwell upon the fact that it greatly restricts the sale of the choice varieties, overcrowds the markets, and forces down prices to the point of elimination of profits. But I have in mind another way in which it does an injury which is very possibly fully as widespread and as lasting as those already detailed to you, and I hope to bring this out in a word or two. I can find no better words in which to describe it than to characterize it as the alienation of the ultimate consumer.

Of that portion of the Northwestern apple crop sold outside of the producing territory, not more than one-third of extra fancy and fancy grades reach the hands of the ultimate consumer in the original package. The remainder are retailed to the purchaser by the half peck, pound or dozen through the agency of the itinerant vendor or pushcart man, the corner fruit store, and the sidewalk merchant. As a class these dealers have little sense of responsibility, less accurate information in regard to the fruits they handle, and none too much honesty. The average customer who buys extra fancy apples by the half dozen or dozen from the corner fruit store or the street vendor has heard of the high quality and unsurpassed flavor of Spitzenberg, Delicious, Jonathan, Winesap or Rome Beauty apples from Hood River or Wenatchee or Yakima, but of every one hundred such buyers not more than ten could identify three of these varieties with certainty. Herein lies the unscrupulous dealer's opportunity, and he utilizes it to make substitution of lower-priced varieties for the choicer ones to an extent which it is difficult to believe until one has personally investigated. I looked into this matter in hurried fashion last winter in Birmingham, Alabama, Atlanta, Georgia, Columbus, Ohio, Washington, D. C., Roches-



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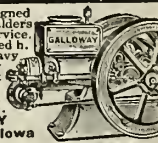
ter and Buffalo, New York, and Chicago, Illinois. In these cities I found genuine Washington or Oregon apples in plenty upon the retail dealers' stands, but I also found Ben Davis, Gano, King David, Aiken Red, and two or three more low-priced red varieties masquerading as Esopus Spitzenberg, Rome Beauty, or Winesap, while Northern Spy, York Imperial, and some others which I was not sufficiently expert to identify with certainty were placarded as Delicious. This I saw not once or twice, but over and over again, so often that I am convinced that growers have no conception of the extent of such substitutions. And the result is everywhere the same; the consumer who has paid five cents each for Northern Spys or Ben Davis of mediocre quality in the belief that he was securing Delicious or Spitzenberg decides that if these are the choicest apples the Northwest can produce, he wants no more of them. As an actual or potential consumer of our fruit he ceases to exist, but he joins his voice with an already large chorus, the burden of whose song is that the Northwestern apple is a mediocre product, devoid of flavor, sugar and everything else but color, and that its producers are little better than holdup men.

This is not a trivial matter, since a large proportion of our better grades are delivered to the consumer under conditions which give opportunity for such substitutions. Nor is it a matter which can be controlled by pure food laws, since the most efficient enforcement of such laws cannot reach more than a small percentage of cases. It can be ended once for all by the removal of these varieties of fruit from a market in which they yield little or no profit directly to the grower while indirectly decreasing his profit on every acre of his better varieties. This can be done in some cases by top-working the trees to better varieties, although the expediency of top-working must be determined in every case only after thorough consideration of all the conditions. Where it is neither safe nor profitable to attempt it and the owner wishes to realize something from the trees while others are coming into bearing, there is another possibility which it has been the whole purpose of this departure from the main theme to suggest, namely: Many of

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these varieties make evaporated stock of the choicest quality, as for example Ben Davis, which makes a white fruit unequaled by any variety except possibly the Baldwin. Were the crop turned bodily into the evaporator, a very considerable share of the harvesting cost could be eliminated, and the operator of the drying plant could make a product a large part of which would grade as extra fancy and choice, hence could pay a price two or three dollars higher than that paid for culls. I have no expectation that this will be done in the immediate future, but I believe I foresee a time coming in which the continued crowding of these unprofitable varieties into the market will have hammered down the general level of apple prices to a point at which the grower will realize a larger profit from them when dried than when sold as fresh fruit, and it would be the part of wisdom to anticipate the inevitable and to take steps to meet it.

Will the evaporator or the vinegar plant handle culls with most profit to the grower? Vinegar making is the least profitable method of converting unmarketable fruit into marketable products. The market is limited by a generally low per capita consumption, which is not materially increasing and which is not capable of any material stimulation; the producer in our territory is handicapped by the bulkiness of his product, the great expense of rail transportation into consuming territory outside a narrow radius, and the strong competition of a product made from factory waste. The market is subject to great fluctuations, since every year of large apple crops in the Eastern or interior apple-growing regions is one of large overproduction of vinegar and consequent heavy decline in price. The business is also necessarily much more highly speculative than any other method of converting fruit into salable commodities, by reason of the long period which must intervene between the purchase of raw materials and the marketing of the finished product. There is no opportunity to judge of the probable state of the market when the goods are to be sold at the time the operator contracts for apples, and it is highly expensive to carry over marketable stock because deterioration is unavoidable. The experienced operator therefore recognizes that he must "play safe" while "going it blind" in

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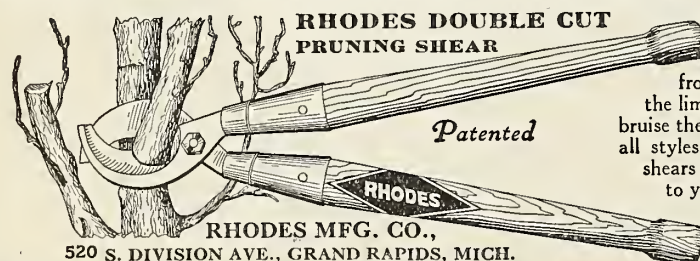
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the purchase of raw materials, and the grower who sells to him will rarely find cause to complain of a lack of sufficient conservatism in the prices offered.

The vinegar plant can make from one ton of average mixed varieties of culls 150 to 163 gallons of juice, which at prevailing prices for vinegar is worth, delivered into the tanks, not more than 7 cents per gallon. Deducting from this valuation a pressing cost of 1½ cents per gallon, we have as the maximum value of apples delivered at the plant not more than \$8.00 or \$9.00 per ton, and the equipment of the plant must be of the most efficient character and the losses in operation reduced to the lowest possible minimum if the operator gets this amount out of them. Consequently a price to the grower of more than \$7.50 a ton would in most cases seriously jeopardize the legitimate profit of the operator, while any utilization of the pomace, as by making of jellies, etc., from second pressings would not increase the potential value of the material more than 10 to 15 per cent.

The making of sterilized sweet cider is a valuable side line for either evaporator, cannery or vinegar plant. It can utilize considerable quantities of apples at \$8.00 or \$9.00 a ton, but it must be borne in mind that this business has distinct limitations and that the average operator cannot hope to extend his business beyond a very limited territory. The making of a satisfactory product is a task presenting considerable technical difficulty, and there is a strong probability that the business will consequently become centralized in a few large plants, properly equipped for handling large volumes of material economically and for making proper standardization of the product.

PEACHES

The evaporation of peaches offers very little to the district which is facing overproduction, since the evaporator cannot offer prices for the better grades which compare with those obtainable in the open market or from the cannery. The cling varieties which are most desired by the cannery cannot be used at all; use can be made only of the firmer-fleshed freestone varieties. The yield of dry product is low, ranging from 225 to 250 pounds per ton, and the market price has been forced below that of apples by the strong com-

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petition of the California sun-dried product. The evaporator may use peaches to lengthen his working season, but could not do so at a price in excess of \$8.00 per ton. This practically eliminates the drying of peaches from consideration except in years of maximum overproduction and complete disorganization of the market or in districts which are out of reach of the canneries.

LOGANBERRIES

The prices which the grower may expect to obtain for loganberries are of course determined by the yield of dry product and the cost of drying, and I shall therefore analyze these items. From 2,000 pounds of fresh loganberries the evaporating plant will make approximately 360 pounds of dry fruit, or one pound from each 5½ pounds of berries. At the beginning of the season or in years of excessive rainfall the yield will fall somewhat below this figure, while toward the close of the season or in years of drought it will rise somewhat above it, but 360 pounds is probably a very accurate average for a plant operating through the season. It may be worth while to call attention to the fact that the first berries which ripen, and which consequently bring the highest prices in the fresh-fruit market, are least valuable for evaporating purposes by reason of their high water content, while those ripening later in the season when the fresh-fruit market has usually declined should bear a premium at the evaporator, as they will usually yield 10 to 15 per cent more dry stock than the earlier portion of the crop.

The actual cost of fuel and labor, including packing, per ton of dry loganberries will of course vary considerably with the type and capacity of the plant, but will approximate \$35.00 per ton, or 1¾ cents per pound of dry product, with not more than 10 per cent variation either way. That portion of the cost of the work which is made up of the items of interest on cost of building, insurance, depreciation of building and equipment, and superintendence of the work will of course vary quite widely accordingly as the plant may be one which operates only upon berries and prunes and for a season of 60 to 70 days or one which has a sufficient variety of fruits to be kept busy for twice that time, but \$15.00 per ton, or three-quarters cent per dry pound, is a fairly close estimate of the cost of those items. This gives a total manufacturing cost of \$50.00 per ton, or 2½ cents per dry pound, for loganberries packed in 50-pound boxes ready for shipment. In some of the larger establishments with a long working season, this cost is reduced to 2 or 2½ cents, while in some of the smaller



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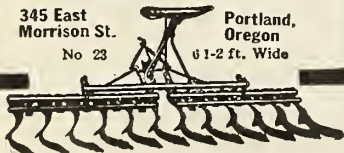
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No 23 11-2 ft. Wide



plants or those under inefficient management it rises above the figure given, but \$50.00 per ton is probably a fair general approximation for the plants now doing business.

If we assume that evaporated loganberries have an average price on board cars at the plant of 20 cents per pound, which is as high a figure as one can take in view of the market conditions of the past three or four years, the maker realizes \$400 per ton. Deducting a manufacturing cost of \$50.00 per ton, there remains \$350 from which to take profits, provide for storage of stock over a period of depression in the market, should such a period of depression occur, and pay the grower for 11,000 pounds of fresh fruit. If we allow 10 per cent of the selling price as profits and storage costs, which would be entirely too small were it not that we have allowed the operator a salary as superintendent of the plant, we have left \$310 as the price of 11,000 pounds of fresh berries, or 28 $\frac{1}{10}$ cents per pound. We may therefore consider 3 cents per pound as an extreme upper limit above which the price to the grower cannot go without wiping out profits so long as the price of the dry stock remains at 20 cents. If the evaporator be a progressive and wide-awake business man, he will pack a considerable portion or all of his product in the smaller package, the sealed paper carton, and will consequently obtain a larger portion of the 35 cents per pound for which such packages are usually sold to the consumer. In such a case, he can pay 3 cents per pound for fresh stock, and can therefore offer the grower as much as is generally realized from berries sold to the canneries.

BLACKBERRIES

The yield of dry fruit in the case of blackberries is approximately 400 pounds per ton. The expense of drying is slightly less than for loganberries, since the fuel used is about 10 per cent less and the time required to complete the drying is correspondingly shorter, but the total cost will range very close to 2 $\frac{1}{4}$ cents per dry pound. It is very doubtful if the evaporator can offer more than 2 cents per pound, which would bring the cost of the dry product, ready for shipment, to 12 $\frac{1}{4}$ cents per pound. Such fruit would come into competition with the sundried California product and also to some extent with a varying volume of sundried wild berries produced in the interior states, and particularly in the Middle South. While the material last mentioned is of extremely inferior quality, it finds a place in the market at prices from eight cents per pound up. For these reasons, practically no evaporation of blackberries has been done thus far in the Northwest, and there seems to be little prospect of such an expansion of the market as will permit the dryers to compete with the canneries for the fresh fruit.

RASPBERRIES

Of the red varieties, the Cuthbert is the only one which is at all in demand for drying purposes, as the market for

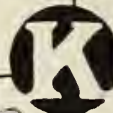
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Clear your stump land cheaply—no digging, no expense for teams and powder. One man with a K can rip out any stump that can be pulled with the best inch steel cable.

Works by leverage—same principle as a jack. 100 pounds pull on the lever gives a 48-ton pull on the stump. Made of Krupp steel—guaranteed against breakage. Endorsed by U. S. Government experts.



HAND POWER Stump Puller

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Old Style Grafting

Ruins Trees.

Destroys Crops.

Grafts often broken by wind.

Limbs split and decay.



Our Method of Side Grafting

Remedies all this.

Saves wax.

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Grafts grow better and mature sooner than by any other method.



It will work over your Grapes, Citrus Fruit and Walnuts with practically perfect results.

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Growers and Shippers of

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SPECIALTIES:

Apples, Peaches, Pears and Cantaloupes

TOPPENISH, WASHINGTON

dry red raspberries is always sluggish. Since the Cuthbert is the firmest of the red types, it does not mat down upon the trays as do the others, nor does it lose sugar through dripping as most red berries do. Consequently, it makes a more inviting product, but is usually sold at a price 1 and 1½ cents per pound below the black varieties. Of the purple cane berries, the Shaffer is the only one which the Eastern evaporators will accept, and it is taken at low prices for the reason that the yield is smaller than for the black varieties while the product, like that of the red berries, must go into the export rather than into the domestic market. Of the black varieties, the Ohio and the Gregg are most desirable to the evaporator. Both are rather firm berries, hence dry readily without breaking down and matting together, and consequently do not require the rehandling which is necessary with berries of the softer types. The yield of dry stock per ton of fresh fruit will average, for Ohio and Gregg, 450 to 475 pounds, for Cuthbert about 420 and for Shaffer not more than 400 pounds. The prices for the dry product are determined primarily by the production in the Eastern berry-growing districts and particularly in that portion of New York bordering upon Lake Ontario, where it is the custom to dry a portion of the crop in years of large yields but to sell practically the whole crop to the canneries and in the fresh-fruit market in years having smaller production. From such figures as I have been able to collect, the evaporator may be expected to realize about 15 or 16 cents per pound for berries packed in 50-pound boxes, 19 or 20 cents for those packed in 1-pound paper cartons. Since the drying costs will be 2 cents per dry pound, the operator will have 13 to 18 cents from which to get his profits, provide a sinking fund to tide him over seasons of low prices, and pay the grower for 4½ pounds of fresh berries. Consequently 3 cents per pound is an upper limit beyond which prices to the grower cannot go, except in the case of the exceptional plant which puts practically all its product into small packages ready for the consumer.

While the price just mentioned puts the drying of berries out of the question in districts which can secure prices of 4½ to 5½ cents per pound from the canneries, it should be said

Cherry Trees

Fruit and Ornamental Trees, Shrubs, Vines, etc. *Free Catalog. Agents Wanted. Special Terms.*

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Nice Bright Western Pine FRUIT BOXES AND CRATES

Good standard grades. Well made. Quick shipments. Carloads or less. Get our prices.

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WHAT DID I TELL YOU, UNCLE JOHN?
GOOD GOODS; HEY, WHAT?

GOLDING IF IT AINT!
YOU DON'T HAVE TER
GRIND ON IT.
I'M FER IT ALL RIGHT.

AND THE SIZE CHEW
ISNT HALF AS BIG
AS YOUR OLD ONE. IT
TASTES BETTER, TOO,
AND WILL LAST LONGER.



THE young fellows teach the old ones and the old ones teach the young—that's the way it is with W-B CUT chewing right along. Less chewing for feeble jaws, less chewing for husky jaws—but the big point is *satisfaction*. Never before has there been so much satisfaction in so *little a chew*. It's *rich tobacco*, W-B CUT is. It makes you feel sorry for the fellows who chew so much of the old kind for so little benefit.

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OUR MONEY MAKING BERRIES

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AMBROSIA—The best and earliest Blackberry; large, sweet and very delicious.
KING OF CLIFFS—Best of all black Raspberries; bears all summer and fall.
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OREGON CHAMPION and CARRIE—Best of all large varieties of Gooseberries.
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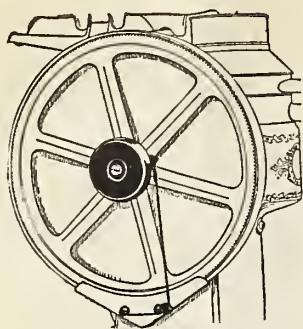
OUR SPECIAL 10 DAY OFFER

We will mail one large plant each of the 10 vines for \$1.00. Regular price \$1.50.

Our Catalogue is Free; send for your copy today. Tells all about them and all other standard varieties, with prices that are very attractive. The Catalogue also describes the "PONDEROSA PEACH," the great yellow free-stone peach. All standard varieties of Apples, Plums, Cherries, Pears, hardy Nut trees, Shrubs, Roses, Garden Roots, and everything for the fruit grower.

Large, well rooted trees and plants give satisfaction and quick results.

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*Insures proper speed on
every NEW De Laval
Cream Separator.*

NINE people out of ten turn the separator handle too slowly.

Thousands of tests with experienced separator operators show this to be the case.

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You will avoid such a possible cream loss if you buy the New De Laval. The Bell Speed Indicator on the New De Laval is a "warning signal" that insures proper speed at all times. No matter who runs your De Laval, this "warning signal" will tell you when the speed is not right. You hear it and do not need to see it. This one feature alone may easily save you the cost of a cream separator in the next few months.

But that is only one of the big advantages of the New De Laval. Other advantages are greater capacity, closer skimming and easier turning, simpler bowl construction and easier washing.

Why not see the nearest De Laval agent at once? If you do not know him, write to the nearest office for any desired information.

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**LARGEST DAIRY SUPPLY HOUSE
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We specialize in Alpha Gasoline and Distillate Engines, Ideal Green Feed Silos, Irrigation Equipment, Centrifugal and Deep Well Pumps and Alpha Spraying Outfits.

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Bush Car Delivered Free

Ride in a Bush Car. Pay for it out of your commissions on sales, my agents are making money. Shipments are prompt. Bush Cars guaranteed or money back. Write at once for my 48-page catalog and all particulars. Address J. H. Bush, Pres. Dept. 3MN. 114-In Wheelbase Delco Ignition-Elect. Stg. & Ltg. BUSH MOTOR COMPANY, Bush Temple, Chicago, Illinois

Everbearing Strawberry Plants

Superb Variety. Will bear from June to November, of large, sweet, red berries, very solid and productive.

Send for descriptive circulars.

W. B. SIMS, Newberg, Oregon

that the cost of harvesting can be very materially reduced when berries are destined for the evaporator. Instead of being picked by hand, they may be allowed to become fully ripe and then harvested by the use of the "bat and tray." This device consists of a canvas tray or bag supported by a rectangular wooden frame, which is pushed beneath the bush at one side by the operator, who then draws the clump of canes toward it with a wire hook and "bats" the berries into the tray with a paddle made of wire and covered with canvas, which in size and appearance strongly suggests that it is a hybrid between a fly swatter and a tennis racquet. By the use of this device, the berries are gathered by going over the patch not more than three times, while one operator will do as much work as three or four following the ordinary methods. While a good deal of litter is present in berries gathered in this way, the larger portion of it can be easily removed as the berries are spread on the trays, and the remainder is gotten out by passing the dried berries through a fanning mill or over a vibrating screen.

PRUNES

While the drying of prunes may be considered as peculiarly an industry of the Northwest, it would seem that few people not actually operating dryers have any very accurate ideas as to the cost of the work or the returns which the grower who disposes of his fruit to the evaporator should have. Hence a word in regard to the cost of the process and the returns to the dryer may not be out of place. The yield of dry product from prunes is very much larger than that from any other fruit handled, averaging slightly more than 600 pounds per ton, although yields of 700 pounds of thoroughly cured product have been obtained. The time required for drying varies within wide limits, but 36 hours is probably a fair average. Consequently the consumption of fuel per ton of product is 15 to 25 per cent greater than is the case with apples. The labor cost is usually little more than one-half that for berries, since a much smaller amount of fresh fruit must be handled and it can be spread upon the trays much more rapidly. For these reasons the cost of drying, as indicated by the investigations of Brown and Bradford in Oregon and my own in Washington, averages about one cent per pound, exclusive of interest charges, depreciation and oversight of the work, which may add \$2.00 to 5.00 per ton, accordingly as the plant is a large one drying other fruits in season or a small one working only with prunes. With a price of 5 cents per pound to the manufacturer and a drying and packing cost of 1½ cents per pound, there remains \$70.00 from which the operator takes his profit and pays the grower for 6,500 to 7,000 pounds of fruit. Consequently a price of \$17.00 a ton to the grower would be equitable in view of existing market conditions, as a basis for a term contract between grower and manufacturer.

GREATLY IMPROVED HORSE COLLAR PADS

Look Where
the
Arrows
Point!



Our new staple and felt reinforcing device gives the hooks a larger, firmer hold on the pad and keeps them from coming off easily. It adds to life of the pad and satisfaction of the user. This form of attachment is

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Ask your dealer for free Tapatco booklet. Shows pads in colors and contains valuable horse remedies. If he hasn't it, request him to write us direct.

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I have tried to state the possibilities and to emphasize the limitations of the evaporator as a means of handling fruits for which there is no favorable market in the fresh condition with equal clearness, because it is fully as important that the grower see the limitations as that he realize the possibilities of the method. In order to make some definite statements as to what the grower may expect to realize from such fruit as can be disposed of in this manner, I have attempted an undertaking of the greatest difficulty, namely, the statement of the manufacturing costs for the handling of the various fruits discussed. Such statements can be only approximations, since every element of cost involved—fuel, labor, overhead charges and depreciation—is subject to wide variations not only in the different portions of the Northwestern territory but also within relatively small areas. Nevertheless I believe that the figures given fairly represent the present costs in such plants as we already have in operation. In order to say what the grower may expect to receive, it is also necessary to fix definite prices which the manufacturer may expect to receive for his product for some considerable time to come. Here one must venture upon prophesy, but I have made my prophetic prices conservative in that I have not assumed that dried fruits will share in the present general upward trend of all foodstuffs, or that the present abnormal demand from the nations at war will continue after the cessation of hostilities. That I am well within reasonable limits will, I think, be shown by presentation of the data as to exports and value of dried fruits for the past four years, as shown by the reports of the Bureau of Foreign and Domestic Commerce of the United States:

EXPORTS.

Apples	Pounds	Value per pound
1913	38,734,465	7.02 cents
1914	31,027,551	7.86 "
1915	33,905,608	7.87 "
1916 (to Sept. 1)	9,692,822	7.88 "
Prunes		
1913	94,344,157	5.84 "
1914	35,228,737	7.34 "
1915	50,775,637	7.08 "
1916 (to Sept. 1)	29,694,290	7.36 "
Apricots		
1913	21,325,528	10.82 "
1914	16,541,222	9.66 "
1915	25,747,600	9.02 "
1916 (to Sept. 1)	29,694,290	7.36 "
Peaches		
1913	5,152,147	6.62 "
1914	7,387,161	6.21 "
1915	18,720,272	5.98 "
1916 (to Sept. 1)	6,264,870	6.46 "

These official figures certainly indicate clearly that despite the temporary disorganization of the foreign market occurring in 1914, the general level of values of these products has been well maintained, and there is every reason for confidently expecting that such maintenance will continue for a considerable period yet to come.

The illustration on the cover page of February edition should stimulate every fruitgrower to plant a vegetable garden, because there is nothing that contributes more to good living than a generous supply of fresh vegetables during the summer. The fruitgrower who has



Two minutes saves each tree

Use Tree Tanglefoot

on Shade and Orchard Trees against Canker Worms, Climbing Cut Worms, Woolly Aphides, Ants, and Tussock Gypsy and Brown-tail Caterpillars. It is equally effective against any crawling insects.

Band Trees About Two Weeks Before Insects Appear to Get Best Results

Easily applied with wooden paddle. One pound makes about 10 lineal feet of band. One application stays sticky 3 months and longer—outlasting 10 to 20 times any other substance. Remains effective rain or shine. Won't soften—won't run or melt, yet always elastic, expanding with growth of tree. No mixing, simply open can and use. Will not injure trees.

For Tree Surgery

Tree Tanglefoot is superior to anything on the market—it is the best application after pruning or trimming. It will water-proof the crotch of a tree or a cavity or wound in a tree, when nothing else will do it.

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1-lb. cans 35c; 3-lb. cans \$1.00; 10-lb. cans \$3.00; 20-lb. cans \$5.50 and 25-lb. wooden pails \$6.75. Write today for illustrated booklet on Leaf-eating Insects. Mailed free.

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143 Straight Ave., Grand Rapids, Mich.

Manufacturers of Tanglefoot Fly Paper and Tree Tanglefoot

Anthony Fence

Under stress of action each wire within a considerable radius is brought into play, affording, to an extraordinary degree, the resistance of a flexible wall of steel—due to the perfectly balanced woven fabric, in which each wire is drawn under equal tension with machinery of special design. Thoroughly galvanized.

American Steel Fence Posts last a lifetime. Hold fence secure against all conditions.

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Make the NEW and Clean the OLD with the MARTIN Ditcher, Dyker and Grader. Makes or cleans irrigation or drain ditches up to 4 feet deep—any width. Makes two to three foot dyke or levee; grades roads. Works in sand, rocks, gumbo or clay—wet or dry—on side hills or level ground.

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ONE OF A THOUSAND
"I never was a great friend of the shovel, and since I have used the MARTIN, the shovel and I have entirely dissolved partnership." F. H. LYTLE, Pioche, Nevada.

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Built for the Field Test.

Three-Quarters of a Century of "Knowing How" Hammered Into Every One of Them.

The product of the Parlin & Orendorff Co. has always been noted for simplicity of construction, great strength and ease of operation. It was upon such a basis that the founders of this business made their implements, established their reputation, and built their factory. It is upon the same foundation that the business has been carried on to this day, and in 1917 we celebrate our Diamond Jubilee; 75 years of practical experience gained through constantly striving to provide for the exacting requirements of three generations of American farmers.

For an even three-quarters of a century we have met the demand, and today we operate the largest and oldest permanently established plow factory in the whole world. "It's the way we build them."



Light Draft Plows, Harrows, Planters and Cultivators are made in all types and sizes, to meet the conditions in all sections, and are Backed by an Unqualified Guarantee.

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Drills through any formation. Five years ahead of any other. Has record of drilling 130 feet and driving casing in 9 hours. Another record where 70 feet was drilled on 2 1/2 gallons distillate at 9c per gallon. One man can operate. Electrically equipped for running nights. Fishing job. Engine ignition. Catalogue W-8.

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an energetic wife, with the use of a steam-pressure canning outfit, can put up enough vegetables during the summer to save buying any during the winter, which also adds much to the living during the winter months. In addition to this, with a good steam-pressure canning outfit, the fruitgrower can put up all his own fruits. There is nothing finer than canned fruits during winter and nothing more wholesome for dessert. The home of the editor is supplied with fresh vegetables during the entire summer and an ample supply of vegetables are canned with a steam-pressure canning outfit for winter use, along with a large quantity of fruits of different varieties. This contributes much to the goodness of the editor's table and in addition is a big saving in expense, both during the summer and winter. Every fruitgrower and farmer should prepare the ground early, planting the early vegetables early, and should they be nipped by frost a replanting can be made. Too frequently in the past fruitgrowers to a great extent have made just one planting, planting the early and late varieties. The modern method is a decided improvement, which is to make a planting every three weeks during the spring and early summer, which enables the family to have a better supply of better quality vegetables than with the one planting of early, medium and late varieties. The vegetable garden is a diversity line for the fruitgrower who has a small acreage and is a source of good income. Good profits are made by truck gardening. The editor calls to mind the experience of a neighbor whose wife looked after the entire vegetable garden, paying the husband for what work he did, supplying their own table during the entire summer, in addition paid the grocery bill during the entire year and purchased a piano besides.

Improvement of Public Grounds

There is nothing that adds more to the attractiveness of the small country town or city than attractive grounds around the public buildings. This remark is also true in reference to the grounds around the depots. In Hood River there is a small but very attractive lawn around the O.-W. R. & N. depot and one around the court house. In California, nearly every depot along the line of the Southern Pacific is surrounded by a beautiful lawn, very attractively arranged with flowers and shrubbery. In Oregon advancement is being made along this line. Arrangements have been made for the improvement of the grounds around the postoffice building at Bend, The Dalles and Eugene. We understand the contract for this improvement was awarded to the Oregon Nursery Company of Orenco; the plans and specifications are being prepared by Mr. H. E. Burdette, L. A., of Portland. "Better Fruit" hopes in the near future to see all of the public buildings, schools and depots throughout the Northwest made attractive with beautiful lawns, arranged with shrubbery and flowers.

Prune Your Trees with GIANT PRUNERS

Cuts every size and kind of limb up to 3 inches thick, with 1 operation

Makes a Clean Cut
Does not Tear Bark
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SIMPLE
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GOOD SEEDS

Ten of the Finest Vegetables

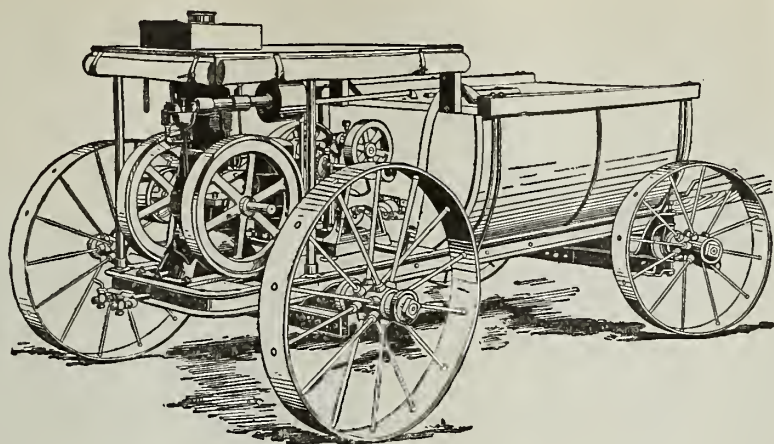
For 25c We will mail one large packet each of the following Vegetables in a coupon envelope. This coupon will be good for 25c worth of seeds selected from our Catalogue on any other order for 75c worth of seeds.

Bradley's Earliest Radish; crisp and brittle.
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Bradley's Earliest of All Lettuce; very crisp.
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Bradley's Perfection Long White Spine Cucumber.
Bradley's Mammoth Yellow Pzizetator Onion.
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25c buys all the above and in addition we will send one large packet "SPENCER SWEET PEAS," a mixture of 10 varieties; regular price 15c.

Big Illustrated Catalogue FREE.

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


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Combines in one smoothly running powerful machine all that the most exacting fruit raiser demands in adaptability to any orchard condition—pressure, pump capacity and economy of operation.

The special all steel underslung truck goes anywhere. Side hills and bad soil conditions are conquered. Its rocking bolster and low center of gravity keeping an even load on rough ground. Closely set orchards are thoroughly and quickly sprayed without usual damage to fruit or trees. Its powerful well balanced engine, built with the same skillful accurate workmanship as an automobile, provides an ever ready source of power, one which is always on the job, willing and sturdy, yet so well designed and constructed that its fuel consumption is the lowest.

The Hardie Triplex pump, with its frictionless plungers and threadless valves, makes speedy high pressure work easy, yet so simply designed and constructed that anyone can run it with a certainty of good success. Equipped with a pressure regulator holding the pressure right to the dot which acts like lightning when the nozzles are turned off or on. When the nozzles are turned off it securely locks the pressure in the air chamber while at the same time all the load is taken off of the pump and engine.

 Viewed from every angle of reliability, ease of manipulation, long life and clean cut economical spraying the Hardie Hillside Triplex has no equal.

Equipment such as this, time-proven, certain and sure, without any of the uncertainty of experiment on your part, puts your spraying on a sound substantial basis.

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MOST IMPORTANT FACTOR
IN THE DISTRIBUTION OF
THE COUNTRY'S FANCY
APPLES
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